Journal

OF THE NATIONAL ASSOCIATION OF CHIROPODISTS

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THE OFFICIAL PUBLICATION OF THE PROFESSION

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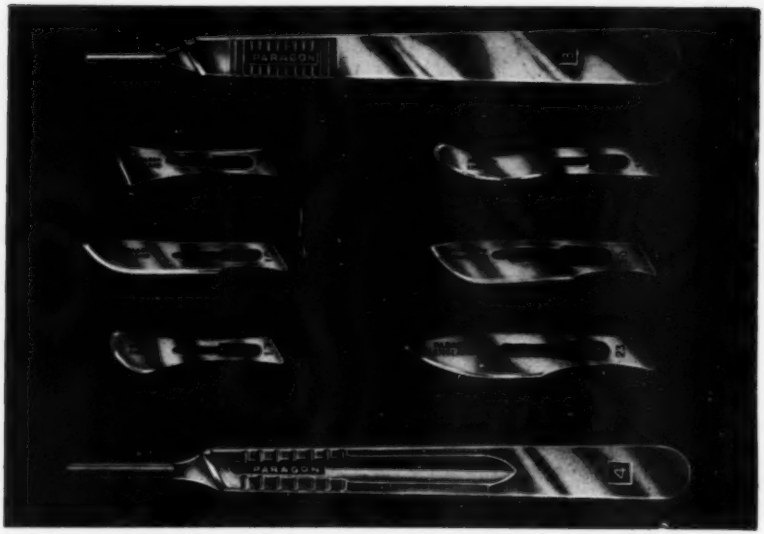

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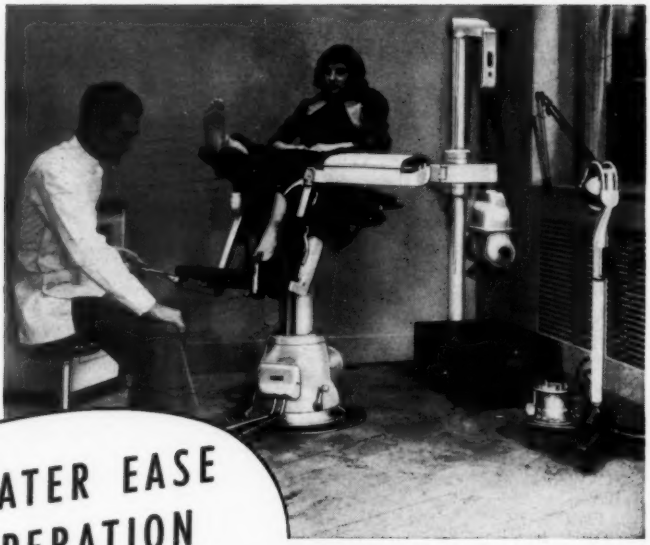

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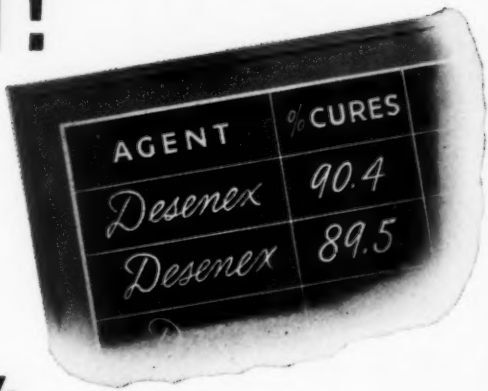

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(1) *Sulzberger, M. B., and Kanof, A.: Arch. Dermat. & Syph., 55, 391-395.*

(2) *Shaw, H. C.: Navy Dept., Bur. Med. & Surg., Research Div. Final Report, Research Project X-448-A.*

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(4) *Hopkins, J. G., et al.: J. Invest. Dermat., 7, 239-253.*

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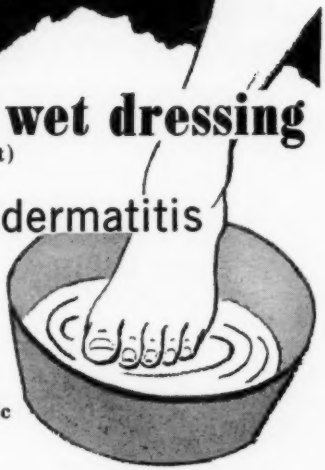

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VOLUME 43 AUGUST, 1953 NUMBER 8

CRITICAL EVALUATION OF THE WEAKFOOT CONCEPT*

LEWIS F. SCHREIBER, F.A.A.C. (Hon.), F.A.C.F.O.
New York, N. Y.
HARRY W. WEINERMAN, D.S.C.
Brooklyn, N. Y.

History of Weakfoot

THE weakfoot concept has survived a life history of more than two generations. It was originally promulgated by the eminent Royal Whitman in his monumental textbook on orthopedic surgery,[1] which passed through many revised editions, the concept having gained increasing support from our profession as it grew in stature. In the endeavor to trace the origin of the term *weakfoot*, the catalog of titles of The New York Academy of Medicine disclosed that Whitman was the author of a paper[2] which he read before the American Orthopedic Association on September 18, 1895, in which he stated his position at the outset, as follows: "The type and exemplification of the weak foot is the so-called flat-foot, . . ." Amplification of this position is stated farther ahead in the paper: "The term weak foot has at least this advantage, that it implies nothing that the student must unlearn, for, if functional weakness is recognized, its causes may be analyzed and appreciated; it is because of the misapplication and misapprehension of the term flat-foot, and because of the associations which have so long obscured the rational treatment of the deformity, that the term has been discarded from the title of this paper."

Whitman introduced the term *weakfoot* in a paper published in 1892; although, according to his own statement, he had first become interested in the term in 1887. He used the term *flatfoot* exclusively in four independent papers published in four different medical journals between the years 1888 and 1893, with the exception of the 1892 paper, totalling five in all. Subsequently, three additional papers by him, on the theme of weakfoot, appeared between 1895 and 1913.

The 1892 paper represented a mild endeavor to propose the new term, not apparent in the title: "The radical cure of confirmed flat-foot."[3]

*This is the seventh in the series of research papers begun in 1944.

In this paper, Whitman took the plunge with his favorite term, *weakfoot*, when he inauspiciously announced his intention on the first page with this statement: "The term flat-foot is in some respects an unfortunate one, in that it does not correctly describe the affection. . . . I propose, therefore, to call your attention to some of the predisposing and exciting causes of weak foot, . . ." In this paper the term *flatfoot* is used preferably to designate pes planus, an inherited affection, or the result of rhachitis in infancy, and is used interchangeably with the designation *weakfoot*.

However, we consider the 1895 paper, referred to in the opening paragraph, a major effort to introduce the term *weakfoot* for general adoption. Thereafter, the influence of the new term gathered momentum in medical circles, and Whitman adopted it exclusively in the first edition of his textbook,[1] in which he states: "The term weak foot has this advantage over others that imply deformity, in that it may include the earliest indications of disability. Once weakness is recognized, its causes may be analyzed and appreciated at their proper value. Flat foot is a particularly objectionable and misleading term, and it should be discarded, or at least used only to describe those cases to which it can properly be applied." (p. 533)

In the two following statements, Whitman stresses the importance of impaired function rather than deformity:[4] "Twenty years ago, when I first became interested in the weak foot as representing more particularly the less advanced type of deformity commonly called flat foot. . . ." (p. 1) He continues a few pages ahead: "From this standpoint, the popular term flat foot is so misleading and inadequate that it has been discarded for one that calls attention primarily to impaired ability rather than to deformity. . . ." (p. 4) In a still later paper the same theme is again stressed, indicating that Whitman was pained by the general disregard of function or ability while great importance was attached to deformity, precisely what he fought against for many years:[5] "I have used the term weak foot in place of flat foot, which is anatomically incorrect and which directs attention to deformity rather than to impaired function."

In connection with the foregoing statements by Whitman, there are two factors that deserve some notice here. First, the substitution of the term *weakfoot* for that of *flatfoot* failed to clear the therapeutic atmosphere after more than half a century, as Whitman had hoped in 1895. The "misapprehension" of the term *flatfoot*, to which he refers, had been aptly transmitted through heredity of ideas to that of *weakfoot* with the same deadly effect that prevailed when the term *flatfoot* was in vogue, indicating that "functional weakness" was not recognized, as he hoped also it would be. Second, he refers to weakfoot as a deformity, *secondary to functional ability*, meaning to describe it as such in the sense in which he deals with it in his textbook wherein he includes the milder types along with the most advanced. (cf., *Orthopaedic Surgery*, 6th ed., p. 665 et seq.)

But, as Whitman states, "if functional weakness is recognized," as we agree it should be, the term *weakfoot* becomes superfluous and even misleading when applied to a foot presenting the classical postural distortions so commonplace among large numbers of the population who never experience "functional weakness" in the course of a lifetime. On the contrary, as will be pointed out in this paper, individuals with weak-

foot posture can exhibit functional stability far exceeding that of others whose foot-build is such that weakfoot (pronation) cannot develop due to uncommon morphological and architectural oddities, such as certain cavus types, yet who may be subject to functional weakness. Hence, the "ideal" foot exists as a figment of the imagination and, if perchance discovered, would not be immune to functional weakness.

An important contemporary of Whitman, and proponent of the weakfoot concept with certain modifications, was the late Otto F. Schuster,[6] who followed in his illustrious predecessor's footsteps for a quarter-century. He was the first member of our profession to accept and teach the concept many years before the publication of his textbook in 1927. He presented the concept in various papers, as well as teaching it throughout his career, from the time he became a member of the faculty of the New York School of Chiropody shortly after its founding in 1911. He was responsible for making the concept stick in our profession through his capacity as Professor of Mechanical Orthopaedics, when the school later became known as The First Institute of Podiatry, and as Chief of Staff of The Foot Clinics of New York, where weakfoot was treated on the Whitman principle. In addition, he maintained a plant for the construction of the Whitman brace for weakfoot, the plate which became immortalized as a household by-word among orthopedic surgeons and chiropodists of metropolitan New York and many distant points of the compass.

In those bygone days, original research on the human foot was almost unheard of in our profession. But this did not, by any means, detract from the scholarly acumen possessed by the very few who, like Schuster, taught theory and practice with equal facility and showed the rank and file how to increase the limited scope of practice to which they were wedded.

It is apparent to the student of Schuster's textbook that the weakfoot concept was superficial to a deeper conviction when reference is made to the functionally impaired foot as of greater significance than the architecturally defective one. A telling statement is made on this point in the chapter on flatfoot:[7] "In most instances, however, the degree of foot defectiveness is not judged as it should be by the extent to which a foot is functionally impaired; it is judged by its shape only." To this he adds:[8] "It all depends upon the viewpoint of the examiner and his mode of judging a foot's efficiency, whether it is a first, second or third degree flatfoot. The one, judging a foot by its contour only, would not unlikely classify the racial congenitally low-arched foot of the negro as a third degree flatfoot—in other words, as a very defective foot, while the other, judging foot defectiveness by the degree of functional impairment, might consider it a normal foot, oddly shaped." On this point, a further doubt seems to occur in Schuster's mind in the definition of the term *weakfoot*[9], the word being enclosed in double quotation marks.

Another timely statement on the ambiguous character of the term *weakfoot* is taken from Brachman:[10] "Articles relating to 'weakfoot' notably go into great detail on objective and subjective symptoms, etiology, pathology, symptomatology, diagnosis and treatment. So much material is covered that it is almost impossible to determine whether the condition is a true entity or whether a large number of foot conditions are being diagnosed and crowded under the blanket term of 'weakfoot.'

It is the author's belief that the term 'weakfoot' is just as vague as the old term of 'lumbago' for any affliction of the back, and that it must be simplified considerably or eliminated entirely from our consideration of foot conditions."

In connection with the practical difference between a good foot and a bad foot, we present the following statements from Hiss:[11] "This book, based on a study of foot function, presents reasonable, clinical proof that a foot may be greatly changed in physical structure, may be deformed, and have hypertrophic changes but still be comfortable. This comfort depends upon sufficient foot function to support the activity necessary each day." The same theme comes up elsewhere in his book:[12] "Structural deformities and pathological changes in bone may often be misleading as to the ultimate comfort that may be obtained by the patient. Rather startling clinical examples, with X-rays, are given in this chapter—some with marked pathological changes from which the patient suffers no discomfort; and other contrasting cases, with no visible pathology, that have very painful symptoms in the feet and legs upon walking." Hiss's law states: *"Comfort Varies Directly with Function."* (Op. cit.)

The Foot An Archetypal Structure

As pointed out on previous occasions, function (work) and structure (morphology) are not pathomechanically related in weakfoot. The point at issue is that diverse foot types are as commonplace as various body types, and in all cases may be regarded as normal to the individual if the odd shapes and contours do not interfere with optimum capacity to perform work without undue restrictions.

Furthermore, the weakfoot stance is exceedingly common at all age levels; in fact, more common than either the high-arched or other oddly-shaped foot types. The human foot is an archetypal structure, inherently capable of working naturally and efficiently, regardless of type of architectural build. The basic foot type of the individual cannot be altered into any other type by ordinary mechanical means, short of surgery or foot-binding, with the possible exception of the infant's foot. Exceptions to this basic law are pathogenic changes brought about by bone disease or severe traumatic impact. The artificial life of civilization has not changed the basic pattern of the human frame in any of its parts. Scientific excavations have brought to light civilizations going back into the night of time, showing that *homo sapiens,* from head to foot, remains fundamentally the same, even down to the crippling effects of some of the degenerative diseases known today.

One need not limit this comparison with contemporary races to learn that, as far back as before 13,000 B.C., the discovery of a footprint of prehistoric man[13] gave evidence of a structure practically identical with that of modern ethnological characteristics. The similarity goes so far as to follow faithfully the gross contours and outline of the toes and the sole of the longitudinal segment as they are found in civilized man today. This footprint was discovered in a recess of the Grotto Aldene in Southern France by Norman Casteret, famous anthropologist and cave expert.

In the course of their investigations, anthropologists and paleontologists, who are *not indoctrinated with habituated forms of thinking in the realm of the scientific,* make interpretations of their findings of human or animal skeletal segments on the basis of possible function or specialized use of the parts. They consider the basic anatomic forms as expressions of the work for which the parts were designed. In like manner, the basic anatomic form of the human foot may be interpreted in terms of utility and adaptability, providing a diverse range of morphological and architectural expressions within the classification of normal.

Histogenesis and Morphogenesis

In setting the stage for critical evaluation of the weakfoot concept, this paper requires preliminary consideration of histologic factors involved in the law of adaptation of structures to the requirements of function or work. In this connection it is well to recall that, governed by physiologic and biologic laws, all tissues undergoing morphologic transformation begin this process from center to periphery of the cell, working from within-without of the gross anatomy locally involved. This process makes its presence known outwardly or morphologically only after the inner histologic changes take place. It is at this stage of the process that various physiologic laws, such as Wolff's law and Davis's law, are said to manifest in such parts, the evidence being more or less objective to the eye.

At this point it is essential to emphasize the fact that neither the architectural build nor the morphologic appearance of the foot is in any way involved in the gross production of the so-called weakfoot posture arising out of histogenesis and morphogenesis inducing changes brought about by either dysfunction or new functional demands of any nature. To assume otherwise would mean the violation of a basic anatomic consideration to the effect that a foot which since early life showed no tendency toward the development of weakfoot posture could transform itself from its original architectural build into that of another type entirely dissimilar in character. To state this position in another way, the cavas type of architecture can no more transform itself through faulty function into the weakfoot type than the body build of an individual can transform itself from the short, squatty frame into the tall, spare type. (cf. The foot an archetypal structure.)

Histogenesis embraces three major types of germinal cells under Wolff's law and Davis's law:

(1) Osteoblasts (bone tissue)
(2) Myoblasts (muscle fibers)
(3) Fibroblasts (ligaments, fasciae, tendons)

In the restricted sense, as applied to physiologic laws, histogenesis means the part played by the germinal cells of the tissues involved in bringing about changes in the local morphology of any structure, depending upon functional demands. In this connection, there are three distinct classes of histogenetic changes: (1) normal, (2) traumatic, (3) pathogenic.

In the same restricted sense, morphogenesis means any change or deviation of the gross form or shape of localized structures induced by

histogenesis, from within-without. Thus, osseous structures, soft tissues, and all organs of the body develop or retrogress in accordance with the law of tissue transformation. The best example of this law may be found in the myogenetic power inherent in striated or striped muscle fibers, highly responsive to all extrinsic and intrinsic stimuli, operating through the germinal cells.

As a result of this innate power of transformation, all anatomic morphologic changes are the direct effects of histogenesis and morphogenesis. Such gross changes are not *pathogenic processes* in themselves, but are simply the result of the operation of histogenesis under *functional or pathologic requirements* occurring in the physical economy, resulting in precise mathematical anatomic effects.

Histogenesis is related to function while morphogenesis is related to structure or form. The external conformation of any structure of the organism is therefore basically the result of the need for the particular form assumed by the part. All structures throughout the body engage in the engineering of tissue-building or unbuilding, locally or generally, according to this physiologic law. Every conceivable biochemical state of the organism is included in these changes, exemplifying Roux's law of causality, the comprehensive law of tissue transformation.

Gross pathology or disease, deformity and trauma, deal with the restricted function of the part according to the state of the structures, but never with the structures apart from the work they are capable of performing. The physiologic laws underlying any state do not deal with gross changes of any kind. Structural changes deal with the internal architectural design created by the germinal cells. Freiberg[14] states that a deformity in this sense is non-pathologic and is simply the result of altered static requirements, whatever the primary cause may be.

From this analysis of the relationship of function and structure, based on histogenesis and morphogenesis, it may be stated that there are four distinct steps involved in bringing about changes in the structures, based on Wolff's and Davis's Laws:

1. Change in position
2. Change in function
3. Rebuilding of internal architecture by germinal cells
4. Gross anatomic result (morphological changes)

The germinal cells are referred to by Sir Arthur Keith as engineers or designers, possessing a high degree of skill and mathematical precision. All structures are designed to carry the load or perform that work only which they are capable of performing under prevailing physiologic requirements—no more and no less until the requirements change. The native intelligence of these structural engineers is such that they truly represent one of the imponderables of the life forces, since they exhibit a highly specialized type of uncanny function far beyond the ken of physiology to fathom.

As Hunter once expressed it, the germinal cells seem to be endowed with consciousness. From this connotation, we may infer that all the life forces of the body, as well as the physiologic processes they control, have their basic roots in the human being's central consciousness or permanent self, referred to in western psychology as the unconscious. Thus, psychology and physiology are brothers under the skin.

Davis's Law of Function and Structure

Concerning functional adaptation, as described by Davis in his monograph, several passages are abstracted from an exposition in that work[15] elucidating his statement associated with the familiar wording of Davis's law. These abstracts show the relation of the universal laws of tissue-structure changes as applicable to the foot. Such functional changes produce the distortions and deformities commonly found in the routine practice of chiropody, those of the forefoot and the phalanges being the most common.

But the rearfoot is not nearly as vulnerable to such distortions as is generally implied when the term *weakfoot* is applied in that sense. The rearfoot is firmly braced by a quaternary of bones—the malleolar articulations of the tibia and fibula from above, and the vice-like grip of the mortise formed with the talus from below—the subtalar articulation being firmly planted on the calcaneum or fulcrum.

In discoursing on scoliosis, Davis states:

"The testimony drawn from the condition of the bones, cartilages and ligaments, after a curvature has existed for years, as proving the cause of the deformity, is perfectly fallacious, for the reason that the same result will take place in any other joint, when retained for the same length of time in the same abnormal position. The condition is the *result* of the curvature and *not the cause*. The bones and cartilages will be absorbed by *unremitting pressure*, the ligaments will be *actually lengthened* by *unremitting tension*, those that are *relaxed uninterruptedly* will *not* be renewed any longer than the distance between their points of origin and insertion. *These laws of the animal economy, therefore, can be relied upon; they ought to govern us in considering the condition* of joints and parts that have long been in an abnormal position."[15]

"... by means of the principle we have promulgated, that a ligament, or other soft tissue, can be elongated to any desirable extent by the use of *continued elastic extension*, we have it within our power to reduce almost any dislocation, without reference to the length of time it has been luxated, but it can be done not only without pain or suffering, but without the slightest danger to life, and with almost a certainty of a perfect restoration of the joint to all its functions."[16]

"We have long noted as a fact that, if a part be placed in an unnatural position, and retained there for a long time, the patient loses the power of volition after a while, in consequence of the brain ceasing to exercise its will over the particular muscles involved, and as a consequence of this neglect of volition, and want of exercise, the muscles themselves lapse into a state of atony, and eventual inability to respond to the will, which is equivalent to paralysis."[17]

"If the reader will turn to page 139, . . . he will find, instead of theories, physiological facts that are incontrovertible—the same results following the conditions there laid down have never failed in our experience of twenty years. . . . Much of this reasoning, from the appearance of parts that have long been in a changed position, is fallacious; in a large number of cases the appearance is the result of the changed position, and not the cause."[18]

The above reference to page 139, on physiological facts, contains the

original statement by that author, which has become known as Davis's law. In principle, Davis's law agrees perfectly with Wolff's law; in other words, the law of soft tissue transformation (Davis's law) is identical in physiological principle with the law of bone transformation (Wolff's law). It is noteworthy to recall that Davis's law (1867) antedated Wolff's law (1892) by twenty-five years.

Natural Pronation in Locomotion

In the act of locomotion, countless changes in position of each segment, in relation to all other segments, take place at the precise moment. In a smoothly functioning mechanism of this sort, multiple factors are involved, for example, in the feet. In the complete cycle of the forward progression of the body, not only does each foot alternate in going through the act of a lever, but the intricate inner workings produce various changes in position, both while actively engaged during weightbearing and during the swing through space preparatory to taking the next step. In the course of the cycle making up the step, the foot expands and elongates during the active phase and recoils or contracts during the passive phase, assuming different positions in both phases. The slight changes taking place on the weightbearing phase produce a relatively different position of the structures in contrast to the non-weightbearing phase. Any change in relative positions during the cycle is to be construed as strictly functional, having no relation to faulty foot mechanics such as pronation, in a pathognomonic sense.

In similar manner, stance requires voluntary muscle balance to maintain the upright position of the body. Pronation is likewise common in stance, just as it is during the active phase of momentary weightbearing in locomotion. The point is that since pronation occurs in locomotion as well as in stance, no issue is made of this phenomenon, by authorities, when it occurs in locomotion. The evidence indicates that the change in the cyclic position of a part represents its natural dynamic activity and is not due to faulty function (work) of the structures.

However, there are times when a change in the position of a part is desirable from a functional, rather than from a structural, point of view. For example, placing elevations under the foot at certain strategic points in order to bring about a change in functional position during locomotion will ultimately remodel the internal architecture, representing the fulfillment of the requirements. But, on the other hand, if a deformity results from placing the foot in an abnormal position, the anatomic result is merely the effect of having functioned in that position for a period of time commensurate with the changed function due to the changed position. (cf. Davis's law)

Fallacy of the Weakfoot Concept

Up to this point, the material presented has been an attempt to set the stage for what is now to follow. To revert to a statement in converse of that made in the first part of this paper, those who are "indoctrinated with habituated forms of thinking in the realm of the scientific" will receive a scientific shock upon reading of a similar shock experienced by Wilson,[19] who "was astonished to find Igorrotes with good functioning flatfeet," an experience he narrates as follows:

"On one occasion there was in Philadelphia, some four years ago, a troop of Igorrotes; and I had twelve or fourteen of these little people come to my clinic, as I wished to show the students what natural feet were like. The subjects varied from five to forty-two years of age, and I put them on a high platform; but as they walked across, I was horrified to find that I was wrong in my conception of a natural unclothed foot. These people, in whom I had expected to demonstrate a perfect arch and a perfect foot, all stood flat-footed, with the feet *pronated in the position that I had used to demonstrate the necessity of mechanical support;* yet they had superb, flexible feet, superb musculature, and capabilities beyond conception. If plates had been applied they would have beautiful arches. My students were appalled, because I had taught them that a natural foot should stand foot-straight, with the arch preserved. I was aghast at the prospect of not being able to reconcile the feet of the savages with my conception of a natural foot; but through the suggestion of one of the students, *I was finally able to show them even though these feet appeared pronated when standing, their arches in action were the standard normal arches. Therefore, the foot was a capable foot.*" (Ital. ours—LFS and HWW)

This experience, of a serio-comical nature, only goes to show that so-called weakfoot is a nondescript misnomer, a nonentity of sinister scientific propensity, best recognized under the heading of "scientific guesswork." Hiss[20] states that " 'Weakfoot' is another antiquated term that means nothing in particular," to which we may add—*particularly nothing!*

The foot of the Igorrote shows no phylogenetic difference compared with the foot of western civilization. This similarly further shows that subtalar pronation is neither acquired nor structurally deficient, but is an architectural foot type of a variety common among many tribes as well as civilized man. (See Fig. 1)

From the evidence now accumulating in the field of orthopodics, as represented by the spiraling intensity of interest shown by investigation into the subject, it is likely that the weakfoot concept cannot long survive the onslaught. The more the profession keeps abreast of the findings in anthropology, the less it is likely to adhere to artificial and antiquated ideas on foot structure and architecture while overlooking natural foot function. Yet, in spite of all therapeutic attempts to throw the center of gravity of the body out of balance by overcoming pronation, it continues to persist in barefoot stance and in locomotion, as it naturally should in a foot of that type.

Incidentally, the foot is the only organ of the body that is held to be architecturally imperfect from the orthodox standpoint, when judged on the basis of the weakfoot concept. As a warning to avoid being misled by the use of the word "ideal" in connection with anatomic form, F. Wood Jones[21] makes this arresting statement: "It is a little difficult to know why the human foot should be selected as an organ that is assumed to have an ideal or perfect form differing from that which the anatomist finds to be normal in the vast majority of mankind. If we substitute 'normal' for 'ideal' in the above sentence, we must conclude that the bulk of humanity is condemned by the normal disposition of the bones of the foot to show some departure from the normal functioning of the foot. The only alternative is to assume that there is such a thing

Fig. 1—Photograph of a Kapsiki fighting man, illustrating pronation of the right foot with bow leg. Fleet of foot, this savage can outrun any civilized man in spite of his "deformity." (From the National Geographic Magazine.)

as ideal foot function and that this function could presumably be carried out by an ideal but not by the normal foot."

One of the world's foremost anthropologists, Jones, dispels the false notion still taught by small-fry "scientists" regarding the evolution of human locomotion from quadrupedal to bipedal means of progression, stating that "It would be better to discard all the drawings that depict the early progenitors of Man as slouching brutes carrying themselves in postures incompatible with the dictates of gravity, and to relegate to

oblivion all the speculations and theories concerning the gradual rise of Man from a quadrupedal pronograde to a bipedal orthograde posture." *(Hallmarks of Mankind)*

The Arch: Rigid or Flexible?

A great deal of controversy regarding the weakfoot concept may be resolved by a consideration of the foot as a structural unit of great integrity. Authorities are divided as to opinions concerning the rigidity or flexibility of the arched structure. Of eleven authorities whose opinions we culled on this question, four consider the arch a rigid structure, six consider it flexible, and one is contradictory within the space of five pages (p. 261 and p. 266) in his famous book on locomotion. Tabulated by name and publication, the opinions of these authorities follow:

NAME	PUBLICATION	OPINION
Steinder, Arthur	Mechanics of Locomotion, etc.	Contradictory
Gray	Anatomy, ed. 27	Arch resilient
Cunningham, D. J.	Anatomy, ed. 7	Semi-elliptic spring
Callander, C. L.	Surgical Anatomy, ed. 2	Arch resilient
Grant, J. C. B.	A Method of Anatomy, ed. 2	Arch is a spring
Morton, Dudley J.	The Human Foot	Arch a rigid structure
Keith, Arthur	The History of the Human Foot, etc.	Arch flexible
Lapidus, Paul W.	Misconception "Springiness" of Arch	Foot a rigid lever
Lake, Norman C.	The Foot	Arch rigid
Engels, W.	German works (1904)	Arch rigid
Jones, F. Wood	Structure and Function in the Foot	Arch flexible, resilient and elastic

The obvious extremes of opinion expressed by the authorities in this tabulation seemingly have one thing in common: *They do not tread on middle ground.* It would be presumptuous on our part to contradict these authoritative opinions if opposed at the extremes they represent. However, we may seek refuge in the wide open spaces of the comparatively safe middle ground on which angels fear to tread and where we may rush in uninhibited. It may be that ours is a voice in the wilderness of conflicting opinion—and it might be drowned by those who are "indoctrinated with habituated forms of thinking."

In voicing an opinion upon the virgin territory of the middle ground, our approach to the problem is made on the basis of personal anatomic and structural observations, supported by authoritative findings concerning elongation and tensile strength of fascial structures,[22] supplied by engineers who made a study of the subject in connection with the conclusion that *the arch is a rigid lever.*

If the arch is held to be a rigid structure, we may disregard the rearfoot as capable of flattening. But we have observed that the *forefoot* is capable of lateral or medial torsion—a frequent cause of instability and, therefore, interfering with normal locomotion. Chopart's articulation further reveals that it is capable of slight movement on its horizontal and vertical axes, which makes it appear that it is a free-functioning unit (within limitations), while the rearfoot (talus and calcaneum) remains relatively stationary. This makes of the arch a semi-flexible lever, with the anterior fulcrum at the metatarsophalangeal articulations. Thus, the forefoot

is particularly vulnerable to shock and excessive wear and tear because it has little anatomic support from the comparatively sturdy rearfoot construction.

In this connection, there is one anatomic pillar of strength in the skeletal structure of the foot which we wish to point out that has not, to our knowledge, received any attention in the past in considering the so-called weakfoot posture. By closely scrutinizing the anatomic formation at the subtalar articulation, it will be observed that the posterior view reveals a wave-like process resembling faintly the letter S laying on its side. The peculiar formation in the joint, and the opposing platforms lipping on both sides of these bones, forms an interlocking device which provides bilateral stability at the site of the projecting process, the sustentaculum tali, reinforced by the calcaneo-navicular ligament.

It is this unusual joint that "holds the line," while superiorly and at each side the talus is held in a vice-like grip in the mortise formed in its articulation with the inferior extremity of the tibia and the malleoli. This anatomic feat of engineering by nature forms an almost foolproof defense against the tendency of certain movements of the foot to fracture easily the talus. It also prevents the subtaler joint from gradually slipping forward or from side to side into what is identified as the weakfoot posture, supposedly dragging with it the calcaneum in the process. The wavy platform making up the subtalar articulation prevents slippage in any direction. Close examination below this platform reveals no tangible evidence of smoothness from slippage at the joint. On the contrary, the surrounding surfaces are rough. (See Fig. 2)

The talus and calcaneum are not only the largest and strongest bones of the foot, but they have the great anatomic advantage of powerful collateral support from the tibia and fibula. To put it another way, the two bones of the rearfoot and the two bones of the leg (which we term the *quaternary*) act together as a column of support prepared to meet the tremendous strains and stresses to which the foot, as a unit, is subjected. At the same time, this allows greater freedom of motion to the forefoot as the hinge-like articulation of the ankle joint executes its excursion. On the other hand, the forefoot is under the anatomic disadvantage of acting as an appendage to the powerful leverage demands of the rearfoot, in addition to its own delicately specialized functions of pivoting and balancing the body and adding spring to the step while propelling the weight forward over the fulcrum at the metatarsophalangeal articulations, for all of which it is admirably adapted.

It is obvious that the quaternary possesses tremendous stability, while "pronation" (extensibility) is a natural by-product of this skeletal combination. Yet, there is sufficient flexibility of the forefoot to counteract interference with its free action in the performance of highly intricate functional movements to sustain the integrity of the foot against shock or fracture under ordinary conditions.

Furthermore, one must not overlook the fact that the rearfoot has a far greater integrity and defense against disalignment than is the case with the forefoot, since the latter is better adapted through its semi-flexibility to guide the foot to a safe landing at the completion of each step in locomotion. In that sense the forefoot is analagous to the landing gear of an airplane, while the rearfoot is like the rigid cabin which it

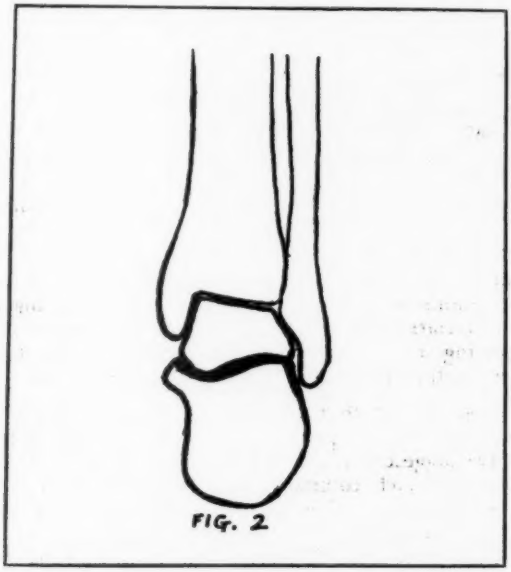

Fig. 2—Illustration of the quaternary (calcaneum, talus, tibia and fibula), a structure possessing tremendous stability to meet all normal strains and stresses. Note the wave-like process at the subtalar articulation (indicated by the heavy line), a feat of engineering by nature to prevent fracture or displacement of the talo-calcanean articulation. (Posterior view.)

sustains and guides. The heel-toe manner of forward progression does not influence this relation, contact of the heel with the surface being of momentary duration while the forefoot bears weight long enough to assure propulsion of the body and to exert a "braking" action.

Engineers[23] have shown by experiment that the fascia lata (covering the thigh), the strongest layer of the body, possesses a tensile strength of approximately 1,476 kg. per sq. cm. or 20,959 lbs. per sq. inch of cross section. The plantar fascia is the strongest single structure of the foot. The estimated tensile load of this fascia is roughly 35 kg. in a person weighing 60 kg., standing on one foot, with weight relaxed. Since it averages 15 cm. long and about 0.5 sq. cm. of cross section, the maximum elongation under stress cannot exceed 1.4 per cent. This means an elongation from 15 cm. to approximately 15.21 cm., *allowing for sagging of the head of the talus of close to 0.1 cm.*[24]

The shock-absorbing property of the foot therefore assumes only an academic interest if the range of its flattening and recoil power is limited to approximately 0.1 cm. It is noteworthy that the sudden application of extreme tensile violence to fibrous structures, beyond their normal tolerance, will not result in a rupture unless preceded by a cortical avulsion fracture of bone at the point of fibrous attachment, indicating that bone must give way before ligaments will tear under conditions of great

stress. Bone is capable of bearing compression stresses while fibrous tissues are built to withstand tensile stresses, in consequence of which the arched structure of the foot cannot flatten to any appreciable degree without violence or bone disease.

Thus, it is clear that pronation represents an optical distortion of what is in fact a natural phenomenon in the complete cycle of static and dynamic forces alternating between limited active extensibility and passive contractibility of fibrous tissue during the act of locomotion. Nor is it difficult to perceive that the extremes of rigidity or flexibility of the arched structure are absent during both phases of the cycle.

We can do no better than present timely abstracts from the famous research team of Schwartz and Heath[25] on the problem of dealing with those common biomechanical disabilities of the foot having little or no relation to the variations in architectural make-up, such as the weakfoot type, yet requiring conservative treatment to provide symptomatic relief and to restore functional efficiency demanded in the pursuit of daily tasks:

> "It becomes evident that we are to deal with variables of those clinical problems most frequently seen. The anatomical definitions of function have suggested a simple and direct explanation of the cause and treatment of such common complaints. However, time and an examination of large numbers of these structures deny such assumed regularity. The inherent variables unite to form a structural unit which serves the function of locomotion. *The feet have, therefore, in common with other structures, a range of variations within the classification of normal.*
>
> "The inherent weaknesses of the human foot have long been recognized. Its potential strength and methods for best utilizing prevailing structural advantages have not received equal consideration. As long as information is drawn only from visual observation of the living foot and from anatomical studies of the static structure, we shall fail to reach a maximum understanding of the requirements of the human foot for its most efficient functioning. Until recorded evidence capable of quantitative measurement and interpretation is more widely applied, therapy, both conservative and operative, must continue to be instituted and evaluated empirically. *This is particularly true in the structurally normal foot, which is dependent upon conservative treatment for the alleviation of pain and fatigue and for the restoration of functional efficiency.*" (Ital. ours—LFS and HWW)

Canadian Army Foot Survey Shatters Morton's Syndrome

To indicate the vast amount of time and work that has been put into the study of the skeletal structure of the human foot, and to deduce therefrom what has been largely accepted as a theoretical means of differentiating between the normal and the morphologically pathognomonic, the outstanding example of the twentieth century is to be found in Dudley J. Morton's book, *The Human Foot,* published in 1935. The deductions of function, on the basis of structure, have always seemed to provide a highly fascinating means of approach to serious investigators of the foot. The nominal admission, on the part of investigators, of the

existence of Wolff's law seems to bear little application to the foot in so far as primordial function is concerned. Instead, these investigators usually present artificial and idealized hypotheses on normal foot function and morphology which could be more readily applied to a manikin than to man. Ironically, the foot is the sole organ of the human frame to be accorded such completely mechanized study without benefit of accepted physiologic laws commonly applied to other parts of human anatomy.

Carrying this point to its logical conclusion by way of example, and, as a practical illustration of the relatively great importance attached to the Morton syndrome in the field of orthopedic work, we present abstracts from Harris and Beath in their highly illuminating observations and interesting statistics gathered from the Canadian Army Foot Survey[26] in which they produce concrete evidence to shatter the Morton theory in actual practice. Referring to the short first metatarsal, they continue:

". . . In actual fact, the problem has never been submitted to adequate study, either by Morton or by others; and there is nothing in *The Human Foot* concerning the association of the short first metatarsal with foot disabilities which might not be the result of coincidence.

". . . The findings of this Canadian Army Foot Survey in respect to the short first metatarsal are of considerable interest and importance, the more so since they do not support Morton's hypothesis.

". . . At the enlistment center, 3,619 men were examined by precise methods. Of these, it was possible to follow 1,391 during their military training and to determine the functional capacity of their feet. From such observations, important conclusions have been drawn in respect to the alterations in function which result from foot defects and abnormalities, including shortness of the first metatarsal.

"The method adopted by Morton for determining the length of the first metatarsal in relation to the second (the position of the most anterior portion of the head of the first metatarsal in relation to a line tangent to the head and at right angles to the axis of the second metatarsal) is open to considerable error, depending upon the position of the metatarsals in respect to varus and valgus.

Findings of the Survey in Respect to the Short First Metatarsal

"In 2,878 feet the first metatarsal was shorter than the second by 1 millimeter or more.

"In 2,693 feet the first metatarsal was longer than the second by 1 millimeter or more.

"In 1,596 feet the first and second metatarsals were of equal length (within 1 millimeter).

"These figures demonstrate that shortness of the first metatarsal is common, but so also is overlength of this bone. The most common state is equality of length between first and second metatarsals (1,596 cases or 22 per cent). The majority of the remaining cases are within a few millimeters of equality, suggesting that this represents the normal for most feet.

"If we arrange the measurements with respect to individual soldiers, we find that in 1,282 men the first metatarsals were shorter than the second; and in 2,337 men the first and second metatarsals were either of equal length or the first metatarsals were longer than the second.

Association of Short First Metatarsal with Pes Planus

"Morton's contention that shortness of the first metatarsal induces pronation of the forefoot and depression of the longitudinal arch makes a study of this association important. It is possible to correlate the two factors from the data of the Foot Survey, and this has been done for several relationships. *In all of these studies, there is no greater incidence of pes planus or of pronation of the foot when the first metatarsal is short than when it is long. We have been unable to find any evidence that the short first metatarsal causes pes planus, pronation of the foot, or longitudinal-arch symptoms.* (Ital. ours—LFS and HWW)

Functional Capacity in Relation to Short First Metatarsal

"The vast majority of soldiers with measurable shortness of the first metatarsal had no symptoms related to the condition and presented no evidence of disturbance of weight distribution. The lack of symptoms when the metatarsal is short was sometimes very striking.

Hypermobility of the First Metatarsal Segment

". . . By clinical examination we could not discover any case in which we thought the first metatarsal segment was so much more mobile than the second as to constitute a possible cause of disturbed weightbearing. The roentgenographic evidence advanced by Morton (widening of the interspace between the first and second cuneiforms) is not pathognomonic. It results merely from the chance that the central beam of the roentgenogram has passed directly through the joint space. In our opinion, hypermobility of the first metatarsal segment does not exist as a separate entity.

Thickening of the Shaft of the Second Metatarsal

"We were unable to find any direct association between thickening of the shaft of the second metatarsal and shortness of the first metatarsal. On the other hand, when the presence of callus indicated that excess weight was borne by the second and third metatarsals, in 44.7 per cent there was thickening of the shaft of the second metatarsal. However, many cases with thickening of the second metatarsal presented no evidence of excess weight borne by it. It may be assumed with reasonable accuracy that, when the second metatarsal bears increased weight for any reason and has done so since childhood, it will respond with increase in size; but there is no evidence that shortness of the first metatarsal is the cause of such excess weightbearing." (End of abstract)

The Metatarsal Formula

Ample evidence is adduced by F. Wood Jones[27] to indicate that metatarsal formulas (the order of projection of the heads) are nothing new, dating back as far as 1855 (Henle) and continuing in a steady stream as recently as 1940 (Frazer). By far the great majority of authorities on anatomy agree that the skeleton of the foot depicts the order in the formula as: (a) $2 > 3 > 1 > 4 > 5$. Next in frequency, another but smaller group of authorities arrived at the formula as (b) $2 > 1 > 3 > 4 > 5$. It is notable to observe that in group (a) the first metatarsal is third from the longest. Commenting on the subject, Jones states:

> "It is the head of the second metatarsal that is typically advanced beyond that of any of the others. Although the head of the second is, except in rare and abnormal cases, the most projected in the foot, there is the possibility of some slight variation around this mean. . . . In the absence of any statistical inquiry into the subject, it is no easy matter to be dogmatic on the point. *Such an inquiry would have to be conducted by forceps and scalpel rather than by radiograph or by the examination of articulated specimens, for into both of these methods fallacies may intrude.* . . . The head of the third metatarsal may occasionally outstrip the second; but *the fact remains that it is normal in Man for the head of the second to be the most advanced member of the series.* . . . Far from being anything like an abnormality of any sort, it is the accepted normal of all anatomists. . . . The head of the second metatarsal is in advance of that of the first at all stages of development—*the condition is no adult acquirement.*" (Ital. ours, LFS—HWW). (See Fig. 3)

On the basis of this statement by Jones, Morton (1935) stands alone among all authorities on anatomy, even though he regards a short first metatarsal as one which "can hardly be called a definite abnormality." As brought out by Jones, the second metatarsal articulates "with the tarsus farther back than those of its immediate fellows. Moreover, this articulation is in every way peculiar, since the base of the bone is slotted in between the margins of the two adjacent cuneiforms and sides of the bases of its fellows." This articular peculiarity is further emphasized by noting the relative distal shortness of the second cuneiform in its wedged position between the first and third. (See Fig. 4)

The position of the anatomist in working with "forceps and scalpel rather than by radiograph," as recommended by Jones, suggests greater scientific accuracy in the results. This position is partly confirmed in the admirable work of Venning and Hardy[28] who make it clear that precise radiographic technique can do no better than standardize unavoidable distortion, when they state: "A shadow is, of course, inevitably distorted to some extent unless it is cast by a plane upon a screen in contact with the plane. *However, the aim in producing standard radiographs is not to avoid distortion, but to ensure a constant amount of distortion on each occasion.*" (Ital. ours—LFS and HWW)

Radiographic Techniques

This now brings us to the point where it is essential to review criticisms that are likely to arise from a consideration of the various radiographic

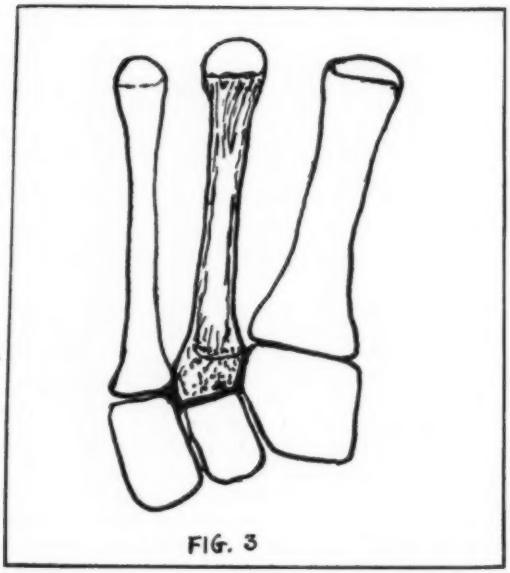

Fig. 3—Slotted articulation of metatarsal II with cuneiform II and adjacent cuneiforms. This metatarsal is the longest in the series, both at its head and base. (Dorsal view, left foot.)

techniques employed in studies of the skeletal structures of the foot by Morton (1935), Harris and Beath (1949), and Venning and Hardy (1951). With all due consideration and respect to these and other workers in the field, allowance for distortion, even if standardized as pointed out by Venning and Hardy, leaves out of consideration significant variations among numbers of individuals grouped together whose foot-build cannot be standardized for radiographic purposes. This factor applies to those exhibiting the extremes of planus or cavus, the changes in individual bone morphology that have taken place over a period of years, the distortions and deformities which bring about corresponding articular and other misalignments under Wolff's law, and the general changes in contours that may be apparent even externally.

On this basis, we hold that any individual can exhibit, radiographically, what may be termed a standard applying only to himself if the range of architectural variation is outside the average of his group classification. On the other hand, with standardization of distortion for any group coming within average morphological build, this factor is reduced to a much smaller margin of error in the interpretation. As an example of the discrepancy that might creep into radiologic studies, a long foot with a higher-than-average longitudinal dome will show greater distortion than a short foot with a lower-than-average longitudinal dome, even in the same sex. In these cases it is obvious that the greater the

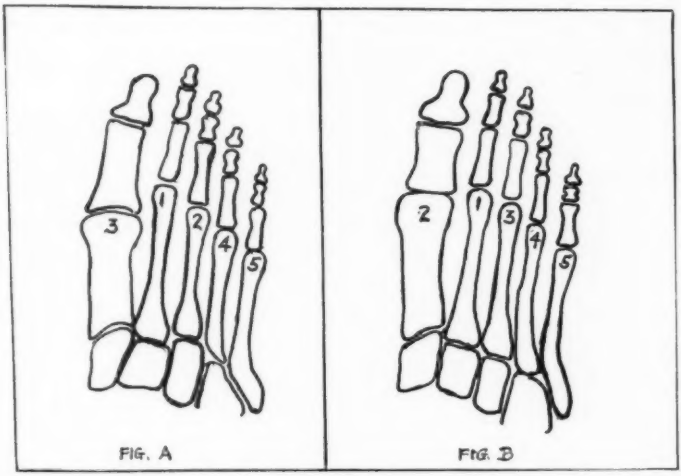

Fig. 4—Illustration (A) depicts metatarsal formula accepted by great majority of authorities on anatomy: 2 > 3 > 1 > 4 > 5. The numbered heads indicate the order in which the metatarsals project in length. Illustration (B) depicts the formula accepted by a smaller group of authorities: 2 > 1 > 3 > 4 > 5.

distance of part of the foot from the screen, the greater the distortion, since the general build of the foot presents the form of an arc in any position, unless it is radiographed contrary to the precise technique recommended by Venning and Hardy, in which case the distortion will be still greater.

The crux of the problem thus brings us back to anatomy, rather than radiology, as presented by Jones (1944) when he states flatly that error will intrude itself in such studies, the best solution being the forceps and scalpel, where distortion is impossible and interpretation is precise.

There is hardly a need, as we view the problem, to assume that Morton is in complete error, or that Harris and Beath are only partly correct, while Venning and Hardy hold the complete solution in radiographic technique of the foot. Since no fool-proof method has as yet been devised, further judgment must be withheld pending future investigation, perhaps in the field of anatomy.

The Short First Metatarsal

The majority of anatomists (cf. F. Wood Jones) agree on the metatarsal formula $2 > 3 > 1 > 4 > 5$, indicating that a short first is normal. It likewise indicates that since the position of the first in the formula rarely occurs after the third or middle place, its shortness may be considered merely as a natural architectural feature of no pathognomonic significance at any time of life. Since nature provided this architectural arrangement, she is quite capable also of providing the necessary bio-

mechanical and functional capacity for the short first segment to perform its work efficiently. The fact that at the approach of middle life many of the functional disorders of the feet begin to manifest is no indication that architectural build is the direct etiologic factor responsible for such disabilities.

It is a fact also that many other parts of the human organism begin to show signs and evidences of functional incapacity and disease bordering on degenerative processes. With the exception of the human foot, soft tissues and osseous structures of the rest of the human frame (architecturally speaking) are not customarily taken into account when various parts become pathologic, unless—as applies equally to the foot—tissue changes indicate the presence of a disease process. But such systemic processes, either in the foot or elsewhere in the body, are not to be confounded with this discussion in which purely biomechanical disorders are considered apart.

We must learn to accept the lesson from the world's leading anatomists that a short first is as natural as a thumb, and that one can live with it in peace if he does not entertain scientific speculations and evolve fanciful theories concerning its relative shortness as nature designed it. Nothing can be done about it, anyway, even with a platform placed under its head to give it a lift which it almost always promptly resents. The system of biomechanics of the body is governed by the laws of physiology, partly recognized under Wolff's law and Davis's law. These laws do not take into account the possibility that some men will attempt to assess the handiwork of nature by some dubious process of reasoning, contrary to what is simple and adequate for all practical purposes of observation and study.

In any consideration of metatarsal formulas, it is perhaps more practical to take into account the general relationship of the projection of all five metatarsal heads as a unit, rather than to consider the limited relationship that exists between the first and second only. These two may present a longer or shorter relationship to each other which might prove misleading if the remaining three are ignored. If the second appears excessively long in relation to the first, thereby giving the impression of a short first, what is the relationship of the first to the third, fourth and fifth? It is quite possible also that an excessively long second aids in counterbalancing a so-called short first, since the second belongs on the medial side of the foot. In any event, why not resort to the dissection and study of foot cadavers and anatomic specimens for additional observations, rather than to rely on the present method of interpretation of radiographic distortions and other anatomic inconsistencies and anomalies?

Summary

1. The weakfoot concept has prevailed since the late nineteenth century and was adopted in chiropody four decades ago. It is shown that function plays little part in this concept, which is based solely on the postular position of the subtalar articulation, resulting in natural pronation.

2. The foot is a primordial structure of incalculable age, while its

general morphology has remained basically unchanged, as shown by anthropological excavations. The pronated foot, the oddly shaped foot, and other variations in pattern, are as normal in function as those whose structure is not "impaired" morphologically.

3. Histological and morphological changes take place in accordance with the law of adaptation of structure to function. Such changes provide the greatest economy to suit the individual requirements in locomotion, except in the presence of trauma or bone disease. The law of adaptation follows in a series of sequential steps: (a) change in position, (b) change in function, (c) rebuilding by germinal cells, (d) morphological changes (anatomic results).

4. Abstracts from Davis's monograph are presented in relation to tissue-structure changes responsible for distortions and deformities of the body. Among those we may include are distortions of the forefoot commonly seen in chiropody practice, but not applicable to so-called "weakfoot," the latter being a natural "distortion" common alike to savage and civilized man.

5. An illustration of the statement, "indoctrinated with habituated forms of thinking in the realm of the scientific," is given when a troup of Igorrotes (a savage tribe) was presented at a clinic by an orthopedist to his medical students. All were chagrined to find the troup *flat-footed* in barefoot stance, with *pronation*, yet presenting superb functional capabilities, contrary to the ideas indoctrinated at medical school on what constitutes the natural foot.

6. Concerning rigidity or flexibility of the arch, tabulation of 11 authorities shows divided opinion, four considering it rigid, six flexible, and one self-contradictory. Voicing a personal opinion, we stand on middle ground on the basis of anatomic observations: (a) lateral and medial torsion movements of the forefoot, (b) adduction and abduction of the forefoot (Chopart's articulation), (c) relative rigidity of the rearfoot (talus and calcaneum), thereby presenting a semi-flexible skeletal structure.

7. Sturdy construction of the rearfoot gives it greater integrity and defense against shock and disalignment than is the case of the forefoot, since the latter performs the delicate functions of balance through intricate semi-flexible movements. The skeletal quarternary (talus, calcaneum, tibia, fibula) provides a solid column of vertical support and tremendous stability to meet adequately all normal strains and stresses.

8. As demonstrated by engineers, the shock-absorbing property of the foot is extremely high, since extensibility of the plantar aponeurosis and other fibrous structures is limited to 1.4 per cent. Pronation *per se* is thereby limited by these structures as a natural phenomenon in the cycle of static and dynamic forces in the act of locomotion.

9. Abstracts from the research team of Schwartz and Heath are presented to indicate that the inherent variables of structures of the body or the foot allow for variations within the classification of normal. These workers state that "a maximum understanding of the requirements of the human foot for its most efficient functioning" must be reached by "recorded evidence capable of quantitative measurement and interpretation" if all forms of therapy are to rise above the empirical.

10. Copious abstracts are presented from Harris and Beath on clinical findings and statistics tabulated in the Canadian Army Foot Survey with concrete evidence to shatter the Morton syndrome. Their evidence indicates that they determined the functional capacity of the feet of Canadian soldiers "by observation of the type and degree of disablement which developed during military training." Roentgenologic studies of 3,619 men proved: (a) in 1,282 the first metatarsals were shorter than the second (app. 35 per cent), (b) in 2,337 the first and second were either of equal length or the first was longer (app. 65 per cent), (c) flatfoot and pronation are not caused by the short first, (d) no evidence by the short first of related symptoms or faulty weight distribution, (e) hypermobility of the first segment is apparently non-existent, (f) no association between thickening of the second from excess weightbearing and the short first.

11. As shown by Jones, all metatarsal formulas presented by anatomists from 1855 to 1940, with the exception of Morton (1935), depict the second metatarsal head in advance of its fellows. This fact "is the accepted normal of all anatomists," is not considered "an abnormality of any sort," and remains in advance of the first throughout life. Jones adds that "forceps and scalpel" would be required for accuracy rather than the radiograph and its unavoidable distortions, especially in view of the findings of Venning and Hardy (1951) regarding the latter.

12. With recent attempts to standardize radiographic distortion, additional factors intrude themselves to present new complications and thus defeat its own purpose. It is pointed out that the extremes of planus or cavus, because of the widely different arcs exhibited, are likely to increase, rather than diminish, the margin of error in the interpretation of standard distortions. Morphological changes, including skeletal and articular distortions, resulting in exaggerated arcs and angles, are among the factors to consider in such radiologic studies.

Comment

In a paper of this nature, emphasis is necessarily directed to the negation of a concept having popular approval. But on the side of the positive there is ample material to build anew on the site occupied by the former structure. Such material is available and is being utilized in the profession. Those who have availed themselves of it prior to, and since, its introduction in these pages in 1948,[29] have been startled with incomparable results not realized in the past when the weakfoot concept represented the focal point of therapeutic attack.

In connection with the material referred to, specific terminology may be suggested for adoption by employing the phrase *tortion principle* to denote medial or lateral imbalance of the forefoot. A companion phrase, *torsion stabilizer,* may be suggested to denote the pad or appliance devised to restore balance, as shown by a reading taken with the *supronimeter.* Combining the three aspects of this material into an all-inclusive system, we take the liberty—not usually the privilege of originators—of respectfully suggesting that it be named the S-W method.

In a previous paper, a proposal was made to adopt the newly-coined term *podoinstability*[30] to replace such outmoded terms as *weakfoot* and

flatfoot. This word represents the generic rather than the specific, in conformity with the law of locomotor stability[31] introduced to the profession as an original contribution.

In practice, the law of locomotor stability takes into account the functional ability only of the locomotor mechanism. It is not concerned with morphological characteristics, such as weakfoot *per se.* It is concerned chiefly with elevating the motor capacity index, the pivotal control factor in *podostability.* In this sense, the etiologic basis is functional while at the same time taking into consideration any coexisting pathogenic background of the general system.

Among those chiropodists whose practice is devoted largely to the management of functional disorders—particularly either the weakfoot type or the short first metatarsal—evidence of a substantial nature lacks to indicate association of architectural morphology with functional instability (podoinstability), when backed by clinical findings of disability or pain syndromes apart from architecture. On the contrary, clinical evidence indicates that *functional strain* and consequent instability predominate in such cases. Moreover, the great majority of cases of podoinstability appear to have their origin on a much broader and more general etiologic basis or synthesis—*purely individual in each case*—and not subject to any architectural classification.

Conclusion

In this paper the human foot is considered as a *basic physiologic structure,* a functional unit which is subject to a large variety of exogenous and endogenous etiologic factors having little or nothing to do with weakfoot morphological characteristics, the latter playing but a purely incidental and secondary part in the concatenation of events leading up to dysfunction. Podobiomechanical and other suitable therapeutic procedures, properly and adequately applied, will bring about rehabilitation to the maximum possible extent, and one ought not judge the results on the basis of the weakfoot concept as having any bearing on the condition. Weakfoot has been treated for many decades upon the false premise that when pain is relieved the objective is achieved—*natural pronation remaining static in the process*—while in actual fact locomotor stability has been restored by elimination of etiologic factors foreign to the weakfoot posture.

Every scientific hypothesis or concept is founded upon a generalization resulting from the accumulation of technical data to lend it support. However, since myriads of particulars are required to reach up to such a generalization, subsequent investigations and observations are likely to bring to light new findings, together with the discovery of former shortcomings and flaws not apparent in the original hypothesis. In line with subsequent disclosures, scientific method then demands modification of the former concept or hypothesis in terms of the newer developments.

Thus it is that many a concept contains a grain of truth that provides an intellectually agreeable groundwork, yet far from acceptable on a practical working basis. The Morton syndrome is a good illustration of this point, as proved by the Canadian Army Foot Survey. On the other

hand, the weakfoot concept has escaped the fate of Morton's theory due to a paucity of observations of the inherent weaknesses of the concept in its practical aspects. Textbooks and countless articles have upheld it by repetitious recital, aided and abetted by those who were "indoctrinated with habituated forms of thinking in the realm of the scientific."

The intensive studies and clinical observations on the part of Harris and Beath bear out their contention that the short first metatarsal "has never been submitted to adequate study" by investigators; adding, furthermore, that association of the short first with foot disabilities may "be the result of coincidence." Similarly, the contention has been made by some members of our profession, but not borne out by extensive investigation, that weakfoot is not a pathognomonic entity, even if the conclusion is arrived at in cases where it is superimposed over Morton's syndrome. In any case, all theorizing in the past has not given us Ariadne's thread to lead us out of the labyrinth.

It is obviously more vital, therefore, that we deal with reality in the case of the functionally impaired foot and concentrate upon restoring its *motor capacity index* to optimum. To state the problem in another way, it is infinitely better to be disillusioned about morphological appearances presented by weakfoot than to mislead the patient and be confounded on just what is being attempted in the way of therapeutic objective. We are all well aware that in the general practice of medicine or surgery the primary purpose is to improve functional capacity and restore better health rather than to attempt to change morphology, certain notable conditions excepted. The clinician need not be deterred, on this basis, from seeking the physiologic explanation for this approach to replace the fallacious one of attempting to effect a cure for something that never existed and has been misunderstood from the beginning.

In the investigation of the weakfoot concept, we have shown that architectural structure or morphological distortion or deformity does not present true criteria upon which to sustain anything but the operation of biologic, physiologic and biomechanical laws, including, for the most part, Wolff's law and Davis's law. Nor has radiology presented a case in defense of the concept, since radiographic interpretations are unrelated to the basic issue of functional ability and capacity of the human foot, which eludes all attempts to pin it down to human preconceptions. To this we may add the admonitions by Whitman and Schuster to regard the foot as a functional, rather than as an architectural or morphological, unit. All of this adds up to the age-old problem of structure (morphology) versus function (capacity for work). On the basis of the evidence herein presented, we rest our case on the latter.

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URGE NON-MEMBERS TO JOIN THE N.A.C.

CLINICAL PHOTOGRAPHY IN CHIROPODY

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ANY verbal description of a foot condition can be aided by an accurate photo-reproduction, especially if color film is the medium used. There is much truth in the old Chinese saying, "One picture is worth a thousand words." With color it is unnecessary to mentally convert the image into color as is the case with black and white reproductions.

This article is not intended to be a complete review of the various methods used in the photography of foot conditions, but rather, an informative paper on the requirements necessary to record conditions in color, and a description of an easy method for making photographs of foot lesions.

Clinical photography is an additional record to use with written reports of unusual cases. It will preserve a clear precise picture; act as an aid in case presentation, and as a guide in reporting case progress, especially in the treatment of children's or orthodigital conditions. Photographs always improve a scientific article or lecture, particularly when diabetic, peripheral-vascular or surgical conditions are presented and they can form part of a case record, which might be very useful for legal purposes. Research material is also enhanced when a project is reported using colored pictures. Another use of photography is for pictures of unusual x-rays, in which the original x-rays have been enlarged and photographs taken of the enlargements.

Basically several types of cameras that can be used in making clinical photographs are:

1—Single lens reflex, such as Graflex or Exakta, etc.
2—Twin lens reflex, as Argoflex, Rollieflex or Ciroflex, etc.
3—35 mm candids as Leica, Contax, Glarus, etc.
4—Argus C3 on a Photek Unit*.

Chiropodical uses—color photographs can be used in the following:
1—Podopediatrics.
2—Orthopedic conditions.
3—Orthodigital conditions.
4—Surgical (before and after picture) and for recording of procedure.
5—Diabetic and peripheral-vascular conditions.
6—Nail and dermatological lesions.
7—Reproductions of enlargements of x-ray plates.

In choosing a camera, the following must be considered:

1—*Film size*—35 mm film is considered standard for projection purposes and is inexpensive when compared to larger sizes, particularly when using color film.

2—*Removable lens*—the ideal method of close-up photography is the use of extension tubes between camera and lens, portrait or other close-up lenses tend to give optical distortion, but can be used if necessary.

3—*Ease of operation*—for speed in taking the picture and preparing the camera for the next exposure, this is essential.

*Manufactured by Harry R. Abuhove, Philadelphia, Pa.

4—*Adaptability of camera other than for clinical photography*—such a camera is the Argus C3 or C2 which will lend itself to all uses. The lens is removable and extension tubes are used to bring the focus down to as close as 6″ and cover as small an area as a 2″ x 3″ field.

Choice of film: When a picture is to be used in chiropodical publications, it is best to furnish the editor with one in black and white as it is the most practical for magazine reproduction. Pictures for all other uses are best made in color. Either "Ansco tungsten" color film or Kodachrome "type A" are used. Ansco film has the advantage in that it can be quickly developed and printed in your own locality. The finished film in either case is returned, mounted in 2″ x 2″ color slides, ready for viewing or projecting.

The use of photography in our practice is often neglected because of inconvenience. It is preferable to have a set-up which is handy and easy to operate. Such a unit is the Photek Unit*, using the Argus C3 camera. The camera and the unit can be ready at a moment's notice. Less than two minutes is necessary to set up the unit and take the picture. It can be utilized for professional work and, by simply removing it from the unit and adding a color filter, the same film in the camera can be used for outdoor personal photography. If indoor snapshots are desired, a flash attachment is easily connected to the camera. The Photek Unit provides a simplified foolproof method for color clinical photography. The focusing and exposure setting task is completely eliminated. Simplified lighting is arranged by using two photo floods in reflectors which are mounted on each side of the camera on a stand, and connected to a tripod. Simplicity is the outstanding feature of the unit. No special lenses are required. The unit uses the camera lens and three different extension tubes. The shorter of the two tubes is used when taking full foot photographs at 20″, while the use of two of these tubes permits taking pictures at 8″. For a close distance of 6″ the longer extension tube is attached to the camera and the lens to the tube. At this distance an area of 2″ x 3″ is covered. All extension tubes fit easily and are connected easily. Three focusing rods are furnished for determining the exact distances of 18″, 8½″ and 6″. In taking photographs of the feet, the Photek Unit is placed on a small tripod, such as the Quick-set Jr. The patient is seated with his feet resting on the foot rest or leg rest of the chiropody chair. The unit permits one not versed in photography to take perfect pictures, since distances are exactly measured, lighting is set and shutter speed remains at 1/10th of a second. The lens opening at the two shorter distances is F16, and at the longer distance F8.

Reproduction of x-rays can be made by using the fluorescent view box in a darkened room. If the size of the x-ray film does not completely cover the box, a black paper mat can be made from the wrapping of x-ray film. Experience will quickly provide the user with slides that show details enlarged with the projector. This means permits one to examine minute structural details of x-ray pictures, which would otherwise be barely visible.

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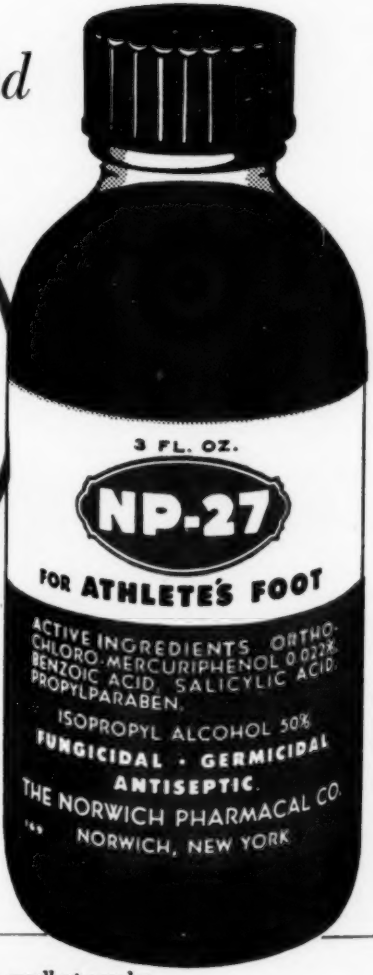

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THE

JOURNAL

OF THE

NATIONAL ASSOCIATION of CHIROPODISTS

PUBLISHED UNDER THE DIRECTION OF THE COUNCIL
BY THE NATIONAL ASSOCIATION OF CHIROPODISTS

DR. WILLIAM J. STICKEL, *Editor*

3500 FOURTEENTH STREET, N. W.
WASHINGTON 10, D. C.

Address all communications intended for publication, matter relating to advertising, business or subscriptions to the Editor.

PRESIDENT'S MESSAGE

CHIROPODY continues to expand and the value of our professional services is becoming increasingly better known. When the N.A.C., in earlier days, was struggling to obtain both growth and recognition, we lacked many of the essentials required of a national organization. Reading some of the old records gives one the impression that we were not as thorough about organization as we might have been. Our rather loose initial organization of the affiliated state societies in relationship to the N.A.C. brought about many problems which have gradually been resolved to the satisfaction of both the state units and the national organization. Obviously, the process of finding solutions for our problems must continue as long as we exist as a professional association.

As I take the highest office which can be conferred upon one in the National Association of Chiropodists, I am firmly convinced of the need for a strong active national organization in our profession. To create the strongest possible N.A.C., we must recognize the necessity of integrating minority opinions with those of the majority in establishing sound national policies. Our national policies must be determined with intelligence and impartiality, and in such a manner as to enlist the support of all members of our profession. Only in this way can chiropody assume its proper place in the health program of our nation.

As your president, I am thoroughly sold on cooperative organization as the most economical and effective method of dealing with the many problems which cannot be solved by our state affiliates or our individual members acting alone. As the number of individual units in our Association increases, it becomes more and more imperative that we build a representative organization. Such an organization is the goal toward which we are striving—an organization which can speak authoritatively for the profession because it has the moral and financial backing of a preponderant majority of the best thinking minds in chiropody.

DR. STEWART E. REED

President, 1953-1954

National Association of Chiropodists

This, then, brings us to one of our most, if not the most important problem which faces us at the present time. This is the question of "membership." This is a direct challenge to every member and every state society to accept primary responsibility for our membership programs. Each member of the N.A.C. must work unceasingly to indicate to non-members his loyalty and support to the state and national organizations. Membership in the N.A.C. should neither be sold nor maintained on the basis that immediate amazing benefits will be forthcoming

without any individual effort. Rather chiropodists should be imbued with the idea that our collective future will be brighter if we all join together and, through pooling our resources, make possible a worthwhile program that will be of genuine benefit to the public and our profession. A successful organization program is not self-starting. It can come about only through the sustained enthusiasm of a united membership which expresses itself, first, by joining the official organization, and then helps to make the program adopted function effectively.

Our professional organizations do not offer magical benefits or insurance against manifold problems encountered in the respective states and by the chiropodist in practice. It is illogical to expect worthwhile results from our association unless you support its programs by contributing financially and by giving freely of your personal time, thought and counsel to the work in hand. The best program ever developed in Chiropody will be unavailing if the enthusiastic support of the membership is not behind the plan. Remember, too, that it is unrealistic to participate in the better conditions brought about by our organizations without doing your share of the work required to attain such improvements. In other words, you should not want a free ride at the other fellow's expense.

In the perilous and uncertain period which may lie ahead for our country and our profession, it behooves all practitioners to band themselves together with the strongest possible ties for mutual counsel and support. This is the way to achieve a truly worthwhile organization, and the friendships acquired in the course of cooperative association work are incidentally worthwhile and helpful.

As I end this first official message, I assure you that I shall do all in my power to help build a stronger N.A.C. and a better profession. To do this, I will, however, need the help and cooperation of my fellow members in working toward our common objectives. I wish to extend my thanks to the membership at large for having conferred upon me the presidency of the N.A.C. and I earnestly trust that I will be able to measure up to the responsibilities which the office entails.

Dr Stewart E. Reed,
President.

CHIROPODISTS AND CIVIL DEFENSE

In the event of a national disaster, chiropodists, along with other members of the health services, will be expected to assume duties outside of their professional fields and cooperate with physicians in the care of all kinds of body injuries. They should be prepared to meet these responsibilities and they should take an active part in the civil defense program which has been created throughout the nation. Learning methods of casualty care and what can be done to relieve suffering and save lives is as much the obligation of a chiropodist as it is of the dentist, nurse, pharmacist, or other health workers.

The type of training required is described in a booklet entitled "The Role of Dentistry in Civil Defense and Courses in Training for Dentists

in the Medical Aspect of Atomic Warfare." This is a brochure issued by the Federal Civil Defense Administration and can be obtained for 25c from the Superintendent of Documents, Washington 25, D. C.

The basis of this special training is the Red Cross First-Aid Training Course. To many chiropodists, first-aid training is unattractive because it suggests courses given to Boy Scouts and housewives, far below the professional level. A few chiropodists who have enrolled in the classes have been bored by the elementary instruction given, and they have pointed out that physicians are not expected to take such courses.

Red Cross first-aid training has much specific information on emergency casualty care to offer and every chiropodist should have it, and, many physicians need it equally as much. How many chiropodists know how to control massive hemorrhage under emergency field conditions? How many know what to do for extensive burns? How many know how to transport persons with back injuries to a hospital without doing the patient additional harm? How many can perform the Holger-Nielsen method of resuscitation? How many know what to do for radiation injuries? These emergency relief measures are taught in the Red Cross course.

Some practitioners have indicated that the course is longer than is required by chiropodists, dentists, nurses, pharmacists and others. It is true that the material given in the standard 22-hour course could be offered in a much shorter period if the lecture method were employed. But such instruction would have little meaning unless the participants actually perform the technics outlined. One must have actual experience in resuscitation, in finding circulatory pressure points, in applying bandages and splints, and in the transportation of seriously injured people.

When the course is concluded, a certificate or card indicating that the holder is qualified as a first-aid worker is issued. Later, in first-aid stations, chiropodists could cooperate with, and assist physicians. They can be assigned and authorized to perform remedial measures for all types of bodily injury as a part of civil defense rescue services. For this they must know more about the care of severe burns, blood transfusions and other casualty services. For this they require the additional training outlined by the Federal Civil Defense Administration, but the first step is—first-aid.

Our state societies and local divisions should arrange to enroll their members as groups in the first-aid courses sponsored by the American National Red Cross. All that they need do is apply to the local Red Cross headquarters for such instruction and qualified professional instructors will be provided and classes for chiropodists organized. The basic course will require about two evenings a week for a month, or one evening a week for two months. Those who take them are well prepared to give efficient first-aid relief in any peace or wartime disaster.

A short additional instructor training course will qualify chiropodists as teachers of first-aid and they may conduct Red Cross training classes for both professional and non-professional groups. In answer to the question, how can chiropodists participate in the civil defense program, this is the reply.

BACK-PRESSURE ARM-LIFT ARTIFICIAL RESPIRATION

HEINZ SPECHT, PH.D.*
Washington, D. C.

ON December 6, 1951, the Department of Defense announced the adoption of an improved method of manual artificial respiration. The new method, a back-pressure arm-lift method originally described by Holger-Nielsen, has been adopted by other organizations, including the American National Red Cross; the American Telephone and Telegraph Co.; United States Bureau of Mines; Boy Scouts of America; Camp Fire Girls, Inc.; Council on Physical Medicine and Rehabilitation, American Medical Association; Federal Civil Defense Administration; Girl Scouts of the U. S. A., Inc.; and Public Health Service, FSA.

Opinions regarding the "best" method of manual resuscitation have never been unanimous. Until 1927, when the Public Health Service Conference on Artificial Respiration was held, a variety of methods were used. As a result of that meeting, a number of groups (1) representing the major interests in this country agreed that the prone-pressure method be adopted as the standard to be taught throughout the country.

Sporadic interest in the basic principle of resuscitation continued in the laboratories, but their findings rarely reached the groups teaching resuscitation methods. The general feeling that manual resuscitation was only partially successful stimulated efforts to develop mechanical aids. Some authorities still consider that the manual method is only a temporary measure to be used until mechanical means can be applied, whereas it is evident from the recent research that proper manual methods are fully adequate.

Analyses of the effectiveness of manual methods on the basis of field experience have not been reliable, for obvious reasons, and the most optimistic reports indicate that not more than 75 per cent of the efforts at manual resuscitation were successful. It is apparent that an accurate estimate of the ratio of successful to unsuccessful resuscitation attempts cannot be made. Unsuccessful cases are not likely to be reported, and reports of successful attempts include persons who would have revived without application of artificial respiration.

It was the realization of this general feeling, at least among the medically and scientifically trained portion of the population, that led the Red Cross in 1946 to support specific investigations on the effectiveness of various methods of manual artificial respiration. In 1948, a conference on this subject, called by the American National Red Cross with a subcommittee of the Committee on Physical Medicine of the American Medical Association, increased the impetus to apply modern methods of quantitative research to the problem. In 1949, the medical laboratories of the Army Chemical Center took up the question in connection with chemical warfare.

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*Dr. Specht is a psychologist who has done a great deal of work in the field of respiratory physiology. He is with the National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Public Health Service, Bethesda, Md.

The import of these discussions, especially as they bore on civil defense activities, brought the whole matter to a critical point. Rapid progress was made when, in 1950-51, the several military departments supported four decisive investigations in response to the need for conclusive data to support the most effective method for inclusion in the pending revisions of the military first-aid manuals. On October 1-2, 1951, the National Research Council's ad hoc committee on artificial respiration recommended that the Holger-Nielsen method be adopted as the standard method of manual artificial respiration. This recommendation was based on a series of investigations (2-7) which should be understood by all public health workers. Although many national organizations teach resuscitation, and it is the direct function of the American National Red Cross to teach the newly selected standard method for the civil defense program, the dissemination of the reasons for the change from the Schafer prone-pressure method should be undertaken by every person in a position to use, teach, or recommend resuscitation procedures.

The several investigations (2-7) form the most significant assay of manual artificial respiration that has been attempted.

Resuscitation Methods

Actually, many variations of several basic methods were applied, but in general it was found useful to categorize the methods functionally as to what is done to the subject and to observe the most effective technique for each of a selected group. These are briefly defined as follows:

Prone Pressure (Schafer). Subjct on belly, head on hands, mouth to side, bimanual pressure applied to lumbar back.

Supine Chest-Pressure Arm-Lift (Silvester). Subject on back, mouth up or to side, operator folds forearms over chest applying pressure, unfolds arms and extends them over subject's head, either partly or completely horizontal.

Prone Back-Pressure Arm-Lift (Holger-Nielsen). Subject on belly, head on hands, mouth to side, operator applies bimanual pressure below shoulder blades, then lifts arms at elbows to expand rib cage and partially lift chest.

Prone Hip-Lift (Thompson, Emerson-Ivy). Subject on belly, head on hands, mouth to side, operator raises hips 4 to 6 inches. (May be combined with back pressure.)

Prone Hip-Roll (Emerson-Ivy). Subject on belly, head on hands, mouth to side, operator raises one hip 4 to 6 inches. (May be combined with back pressure.)

The principal difference between the prone-pressure method and the others listed is that the latter include an active inspiratory maneuver either by manipulation of the arms or by raising the hips. This action affords not only greater tidal exchange but also, perhaps, a larger surface for gaseous exchange.

One of the more important advances in methods of study of manual artificial respiration lies in the use of curarized and anesthetized volunteers (2) whose flaccid condition simulates the deep asphyxial condition of the more serious apneic cases. In addition to this, large numbers of

acapnic apneic volunteers, some traumatic apneics, and large numbers of fresh cadavers were also subjected to the various artificial respiration methods. The various approaches gave essentially similar results (2-7) which will be briefly paraphrased here.

Results of Studies

The studies on air-flow patterns and pulmonary ventilation (2) show that the two-phase methods as a group are about twice as effective as the prone-pressure method. Pneumotachographic analysis shows that a rate of 10-12 complete cycles per minute in these cases permits completion of each cycle.

Pulmonary ventilation studies on nonapneic subjects (3) gave results similar to those on apneic subjects, indicating an equivalence of the various two-phase methods and a twofold superiority over the prone-pressure method.

Studies on the mechanics of breathing during artificial respiration by the various methods (6) showed that the two-phase techniques were superior to the prone-pressure method in clinical traumatic apneics and that air-flow measurements indicated a better utilization of the respiratory cycle for ventilation in the two-phase techniques than in the prone-pressure method. A similar experience regarding the efficacy of the various methods (7) was reported from another group of clinical apneics in which higher rates of respiration were found to be more effective.

Circulatory studies (2) showed that the prone-pressure method could not maintain adequate blood oxygen levels in three of nine cases and that it gave the lowest blood oxygen levels of any method used. All the two-phase methods gave adequate blood oxygen values, although none produced normal saturations. Hyperventilation was not found to be deleterious in these subjects.

The energy expended by the operator in carrying out the various maneuvers was assessed in terms of oxygen consumed per unit time (2,4). It was apparent that the prone-pressure maneuver was least taxing, the hip-lift method most taxing, and the others intermediate.

The "teachability" of the previously non-standard methods (5) was assessed on a large group of operations (667 male and 214 female). Both objective and subjective reports indicated that a 10-minute instruction period was sufficient to adequately teach the various back-pressure hip-lift maneuvers. The back-pressure arm-lift method was found to be more readily learned than the hip-lift maneuvers. The principal difficulty leading to variation in learning and execution lies in the difference in size between the operator and the subject.

Together with the background of earlier work these data indicate that the prone-pressure method (a) produces the least pulmonary air exchange of the major methods that have been proposed; (b) that in some individuals the air exchange is no greater than the volume of air in the respiratory passages; and (c) that it is less effective in flaccid individuals, that is, as occurs in deep asphyxia.

Although nearly all methods in the hands of unskilled or unthinking operators may produce trauma, especially where damage exists, there

Back-Pressure Arm-Lift Artificial Respiration

Correct positions for the back-pressure arm-lift method of artificial respiration are illustrated below. In this method the person is placed prone with the elbows bent and with one hand upon the other. The forehead is placed on the hand with the face turned slightly to one side. The operator kneels on one knee at the head of the victim.

1. To start the cycle the operator places his hands on the victim's back so that the thumbs just touch and the heels of the hands are just below a line between the armpits.

2. He then rocks forward slowly, keeping the elbows straight, until his arms are approximately vertical, exerting steady pressure upon the back.

3. Then he rocks backward, slowly sliding his hands to the victim's arms just above the elbows.

4. Continuing to rock backward he raised the arms to lift the chest weight from the floor and expand the chest.

are no such reports from countries where the back-pressure arm-lift method is practiced generally. On the other hand, the prone-pressure method has been reported to have caused occasional trauma principally in the hands of large operators on slight or immature victims. Obviously, discretion must be used when traumatic accident cases are handled. For this reason alternative methods should be available. From the several two-phase methods, such a choice can readily be made without serious loss of ventilating efficiency.

It is apparent that the back-pressure arm-lift (Holger-Nielsen) maneuver is the choice for a standard manual artificial respiration method, on the basis of efficiency, ease of teaching, and feasibility.

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MEDICAL DISCOVERIES

If I were asked what single factor had contributed most to medical discovery, I should reply "chance." But I should hasten to qualify this by saying that the gifts which the Fairy Godmother brings only come to those who are industrious in using them and whose minds are ready to receive them. . . . This association of chance with an ability to recognize the gift, if and when it comes, has impressed all who have been interested in the history of discovery and has, perhaps, been put into words in the celebrated saying of Pasteur, that "In the field of observation chance favours only the prepared mind." And I would go yet further and add that the boundaries of any discovery are set by the limits of the technical resources of the time. Technical methods are the necessary handmaidens of the research worker, but in saying this I would state immediately that elaborate technical methods are most certainly not necessary to the discovery of new facts, any more than they are necessary to the evolution of new ideas; indeed, they may by their very elaboration become a bar to progress. By all means let us employ instruments of precision if we have them, but let us not throw up our hands in despair if they are out of our reach. "The machine," said Chesterton's Father Brown, "cannot lie. Neither can it tell the whole truth."

The Postgraduate Med. Jour., Feb. 1953.

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DYNAMIC TENSION TECHNIQUE FOR INVERTED NAIL CORRECTION

JEROME BRAND, D.S.C.
New Haven, Conn.

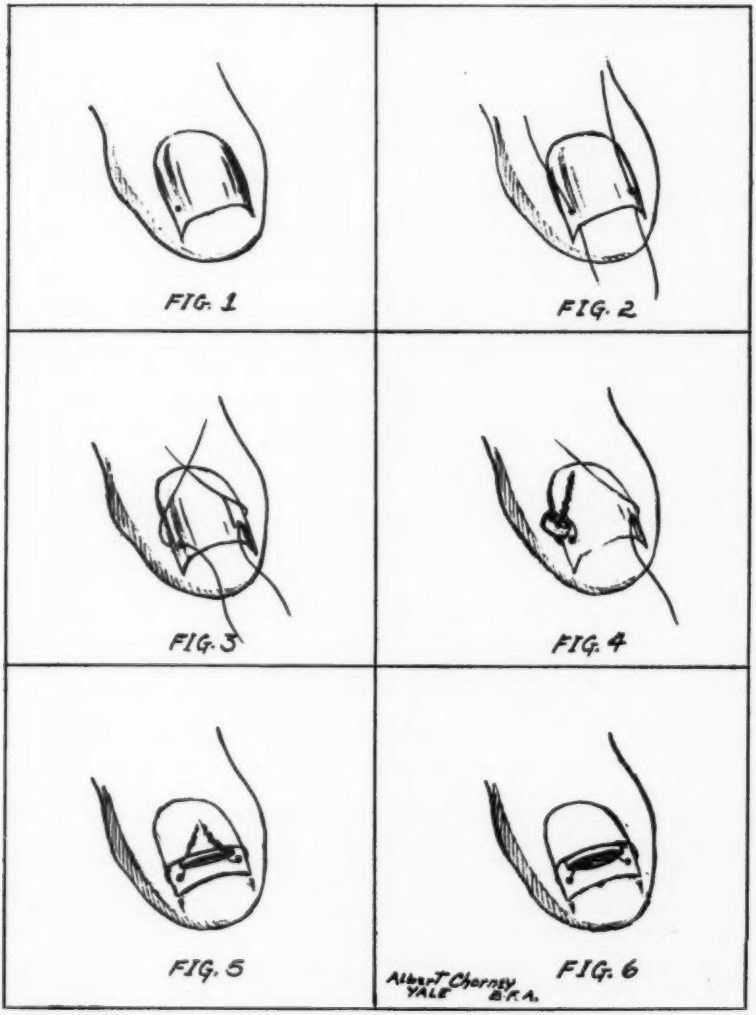
THE problem of the inverted nail has long presented many difficulties in the practice of chiropody. The two most generally accepted methods of treatment have been the radical surgical removal of the lateral border of the nail and its associated nail fold, or the palliative removal of the inverted portion of the nail, with subsequent packing of the nail groove. Even though radical surgery for this condition has been successful in a large percentage of cases, there persists an obvious reluctance on the part of both patient and practitioner to resort to this drastic type of treatment for this condition. On the other hand, the palliative procedure has resulted in the narrowing of the free end of the nail plate, and the formation of new and heavier callous growth in the nail groove as the nail grew outward and pressed against the groove.

Following a demonstration of nail wiring technique by Dr. Harvey Atkinson, who originated its theory, the procedure was tried on several patients and found to be promising, but with some limitations. The results were not uniformly encouraging, and the course of treatment seemed to be somewhat long. I felt this may have been due to faulty technique on my part in the way of the packing Dr. Atkinson recommended or that the tension I placed upon the wire was not right. However, the results obtained convinced me that the theory of nail wiring was one that held a good deal of merit. At this time I felt if a simpler, more foolproof technique could be developed, the problem of the inverted nail and its associated callused nail groove could be eliminated.

My first impression was to use a continuous, dynamic form of tension on the nail, instead of a static measure as had been suggested. My own experience with the static type method had shown a definite loosening of the wires, which had tightly and securely been applied, after only a few days or a week of wearing. Whether this was due to the stretching of the wire, loosening of the attachments of the wire, or perhaps to some slight correction of the nail, I was not sure. The fact that the wires were loose after a comparatively short time of wearing led me to believe that a continuous form of tension applied to the nail would be more satisfactory.

The question of what to use, and how to apply it, seemed to be the first obstacle to overcome. A quantity of tiny brass springs of various tension strengths were obtained. These were fastened to the nail, but had a tendency to ride off the front end of the nail plate, and were discarded as not practical. A curved steel spring was tried next, but this too had its drawbacks. Equally unsuccessful were flat coil springs. Finally, a small rubber band was used and this seemed to solve the problem except that the tension was not variable.

At a professional supply house, a quantity of rubber pipette tubing was purchased in various thicknesses and diameters, and small pieces were cut from the end making tiny elastic bands that did the job excellently. The thickness of the piece of tubing that was cut controlled the amount



of tension that was available to be applied to the nail. The wider the band the more strength and pull was utilized. The tubing that I now use is No. 3981 Davol Amber Latex, 5/32" x 3/64", and I find it just about right.

Using a round head number 2 or 3 dental burr, a small hole is drilled into the lateral and medial borders of the affected nail, as far posterior as possible, but staying in that area that is unattached. The drill is kept running all the time the burr is in the nail, both on drilling through

and on withdrawing. The direction of the drilling should be started from the under side of the nail and up and out through the top of the nail plate. The location of the holes is shown in Fig. 1. A four-inch piece of No. 26 gauge silver wire is inserted into each of the holes starting at the top of the nail and emerging anteriorly at the free end of the nail as shown in Fig. 2. This end is now brought back along the lateral side of the groove and locked in a position, posterior to the wire extending into the hole, as shown in Fig. 3. This same procedure is followed on both sides of the nail plate.

A piece of the pipette tubing is now cut about one-eighth inch wide. This forms a small circular rubber band. The band is placed over the posterior wire, and brought down close to the nail. The two ends of the wires are now twisted together about ten turns, the excess clipped off and locked as shown in Fig. 4. The twisted wire should be left about three-eighths of an inch long or else the wires will become undone due to the tension upon them. The posterior wire on the other side of the nail is now brought across the nail and slipped through the rubber band. It is then firmly pulled back, stretching the rubber band completely across the nail plate, where it exerts a strong upward tension on the lateral edges of the nail. The two ends of the wire at this side of the nail are also twisted together as shown in Fig. 5. The excess wire is clipped off and the long twisted ends are tucked under and hidden under the rubber band as shown in Fig. 6.

A strong, short-jawed hemostat is now placed into the lateral grooves and the edge of the nail is firmly grasped. A rotating and lifting twist is carefully applied to the patient's tolerance and released. This raises the edges of the nail and allows the rubber band to contract slightly. The nail will now be found to remain slightly elevated in both corners. An antiseptic is now applied to both nail grooves and the entire device is covered with a band-aid. No packing of the lateral grooves appears to be necessary, as the nail is elevated and the corners of the nail are practically free at this time. The patient is instructed to return in three weeks.

When the patient returns, the wires are examined and if they appear to be in good condition, not slipping, or untwisted, the groove is debrided with a probe, and all debris and callous removed. The corners are again raised with a hemostat and the band-aid reapplied. As the nail grows it may become necessary to repeat the whole procedure further back on the nail plate another time, before correction is finally obtained.

This technique of nail correction has now been used on 32 patients, both male and female, whose ages range from 30 to 66. Most of the nail plates had a slightly heavier than normal texture. The results have been uniformly excellent with the exception of one case where the nail plate was rather thin and the wire broke through the plate and came out. All the other patients obtained an immediate cessation of symptoms at the corners of the nail and felt no discomfort in the wearing of this device, even in the dressier type of footgear. The average length of time that the wires were applied ranged from 4 to 6 months. The patients were seen every three weeks for three visits and were then seen every four weeks for the duration of the treatment.

152 Temple St.

STATE BOARD STATISTICS

L. A. HANSEN, D.S.C.*
Kansas City, Mo.

FOLLOWING communication with the deans of all accredited chiropody colleges, we inquired regarding what questions their senior students asked about state board examinations. From the replies forwarded by the deans, we made up a questionnaire and sent it to all boards. Forty-four of the boards replied. Some of the information and statistics from these returned questionnaires is presented here:

1—*Subjects:* Gave examinations in 44 subjects.

2—*Practical examination:* Given by 18 boards (10 required examinee to bring gown and instruments).

3—*Time limits:* For making application for the examination varied from one day to six months (most boards gave from fifteen to thirty days).

4—*Lowest passing grade:* In any one subject as follows—(8) require 50%; (1)—55%; (9)—60%; (1)—65%; (8)—70%; (16)—75%.

Average passing grade needed:

3 require 70%; 39 require 75%; 2 require 80%.

5—*Failures:* In one subject 30 boards require entire new examination; 4 boards did not require complete examination if failure was in one subject; one board requires reexamination only in the subjects failed up to the fourth examination.

6—*Frequency of examinations:* 19 boards, once per year; 23, twice; 1, three times; 1, four times.

7—*Examination fees:* 1, no charge; 3 charge $10.00; 2, $15.00; 3, $20.00; 22, $25.00; 1, $28.00; 1, $30.00; 5, $35.00; 1, $40.00; 4, $50.00.

8—*Renewal fees:* (5) no charge; (5) $1.00; (7) $2.00; (1) $2.50; (5) $3.00; (12) $5.00; (4) $10.00; (1) $13.00; (1) $15.00; (1) $20.00.

9—*Reexamination fees:* (2) $2.00; (2) $5.00; (9) $10.00; (3) $15.00; (1) $17.50; (1) $20.00; (9) $25.00; (2) $35.00.

10—*Reciprocity:* 26 boards offered; 18 did not. Fee varies as follows: (3) $25.00; (1) $40.00; (13) $50.00; (1) $60.00; (1) $75.00; (6) $100.00. Some boards did not indicate the period of practice required for reciprocity eligibility. Those which did, reported as follows: 3 required one year; 5 two years; 2 three years; 6 five years.

11—*Registry of license:* 31 boards require it: 25 with county; 2 with city; 3 with state. The fee varies from twenty-five cents to one dollar.

12—*Locations for practice:* Based on towns with 8,000 population: 8 states reported they had none; 19 stated there were from 3 to 125 such towns; 17 indicated they did not have this information.

A detailed copy of the information provided in the questionnaires by the state boards was sent to 318 senior students, to all secretaries of boards, and to N.A.C. officers. To my knowledge, this is the first time a project of this kind, intended to aid senior students, has been accomplished. I trust they will appreciate it and become members of the National Association of Chiropodists shortly following their graduation.

*Chairman, N.A.C. Committee on State Boards.

CHIROPODOLOGIA

In 1768, Dr. D. Low specialized in the care of the feet and practiced on Davies Street, W., London, England. He designated himself a "chiropodist" and in 1774 published a book entitled "Chiropodologia, a Scientific Enquiry, into the cause of Corns, Warts, etc." This volume is being reprinted in serial form because of its historical interest to members of the profession.

CHAPTER VIII

Of the Treatment of Warts

We know of two general methods by which Warts may be cured; namely, extirpation, and the application of external remedies. Turner, however, recommends for this purpose three remedies; and these are the cautery, whether actual or potential, incision, and ligature.

These different expedients are to be adopted according to the species of the Wart; but it is always necessary to examine previously, whether or not the excrescence be accompanied with a malignant quality which may render it cancerous. In this case, the diagnostic sign is a continual pricking, accompanied with an unusual sense of pain in the part affected. We must also pay a particular attention to the spot on which the excrescence is situated, in order to enable us to determine the proper remedy, or treatment, which should be adopted; for otherwise the patient might probably be exposed to accidents similar to those which I noticed in the last chapter upon Corns.

The round, and the pendant Warts being nearly similar, the same treatment is proper for both, when their situation is favourable for it; that is, when they are not placed upon the joints of phalanges. In such cases, we may employ the method of ligature, and effect an extirpation of the Wart without incurring the danger of a defluxion. For this purpose, let the root of it be tied round with a bit of horse hair, or waxed thread, and compressed to what degree the patient can bear. By these means the juices are intercepted in their communication with the part; and the Wart, with ease desiccated, falls off insensibly. In order to get rid of it more expeditiously, I have often seen the part rubbed with arsenick, or sublimate; but this is a practice highly dangerous. When the Wart has begun to disappear, however, it may not be improper to apply to the root an escharotic, or even a common needle, made red-hot; nor can any mischief flow from the application of a spider's web, according to the method which in the preceding chapter I described the gentleman to have used with success for his Corns.

Under like circumstances, Warts of either of these species may, with equal certainty, be conquered by incision. This operation is performed by cutting them till they are reduced to a level with the skin. It is an operation, however, which renders the use of a cautery necessary, in order to dry up the root of the Wart effectually; whereas the operation of ligature is, of itself, generally sufficient to carry it off entirely.

The Warts in question may also be destroyed in the same manner as Corns, by slightly opening them around with a proper incision-knife. But this is an operation which should never be performed but by a person of knowledge and experience, unless the patient be willing to expose

himself to every risk which can flow from the want of those qualifications, so essential to a real Chiropodist.

The flat Warts, namely, the verrucae formicariae, or, as they are likewise styled by the Ancients, myrmecia, are still more difficult to be removed; and for this reason, that, beside being less prominent than the others, they are more deeply, and more firmly rooted.

Many authors have delivered it as their opinion, that Warts in general should be cauterised; and for this purpose we find the most violent of escharotics prescribed, such as Sulphur, the Lapis Infernalis, and Sublimate. For complaints so trifling, however, let patients beware of having recourse to applications so dangerous.

(To be continued)

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Members who desire to submit papers should make application on a form which can be obtained from the Executive Secretary. The rules for the 1954 awards are published in the July, 1953, issue of the Journal of the N.A.C.

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BENJAMIN FRANKLIN, HYGIENIST

BENJAMIN FRANKLIN was one of the earliest hygienists. He discussed exercise as a means of preserving health and sought the best kinds to use. He explored, too, the influences of swimming, cold baths, and fresh air on health. The modern treatment of tuberculosis is based in part on the open-air mode of life which he long had advocated. "Colds" were a favorite topic, and Franklin's writings on the subject are his nearest approach to medical articles. He believed a person caught cold if he were in a close, unventilated room with other people who already were affected. He thought damp clothes might cause colds, but that clothes wet with sea water would not, because "no clothes could be wet as water itself, and one did not catch cold while bathing and swimming." Franklin gathered notes for an article on colds which, if the questions he posed were an indication, would have been the most comprehensive of its day. Unfortunately, he did not live to write it. In many letters to his friends, he discussed diet and its effect on health and disease. For example: "In general, mankind, since the improvement of cooking, eat about twice as much as nature requires. Suppers are not bad, if we have not dined, but restless nights naturally follow hearty suppers after full dinners. Indeed, as there is a difference in constitutions, some rest well after these meals; it costs them only a frightful dream and a apoplexy after which they sleep till doomsday. Nothing is more common in the newspapers than instances of people, who after eating a hearty supper are found dead abed in the morning."

Franklin liked to tell the story about the dinner party he attended at which a fat, jolly man complained of a fever for which the doctors had done nothing over a three-year period. "On which I asked him," Franklin wrote, "If it were not now time to inquire whether he had any fever at all. He is indeed the only instance I ever knew of a man's growing fat upon a fever." Franklin wrote also on the heat of the blood and the causes for it. His library, one of the best in the colonies, had a glass machine that demonstrated the motion of the blood through the arteries, veins, and capillaries. Other subjects that stimulated his interest were absorbent vessels, perspiratory ducts of skin, sleep, deafness, nyctalopia, cancer, and yellow fever. Franklin's letters on lead poisoning are classics in medical literature. One, to his friend, Dr. Cadwallader Evans, said: ". . . you mention the lead in the worms of stills as a probable cause of the dry bellyache among punch-drinkers in our West Indies . . . general mischief is done by the use of leaden worms, when rum distilling was first practiced in New England, which occasioned a severe law there against them. . . . I have long been of the opinion that the distemper proceeds always from a metallic cause only; observing that it affects, among tradesmen, those that use lead, however different their trades—as glaziers, letter-founders, plumbers, painters . . . and, although the worms of stills ought to be of pure tin, they are often made of pewter, which has a great mixture in it of lead . . ."

From "Benjamin Franklin's Contributions to Pharmacy and Medicine," by Walter Frankel, M.D., in The Merck Report, Oct., 1952.

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The Journal of the National Association of Chiropodists

Deadline for Journal copy is the 10th of the month before publication (example: copy for June issue should be in our hands by May 10th). The Journal is usually mailed between the 20th and 25th of the month noted on the issue (the June issue is mailed between the 20th and 25th of June).

Orders for reprints must accompany manuscripts. Authors should state quantity desired at the time paper is forwarded to the Journal.

Manuscripts must be typewritten, double spaced, and an original copy must be submitted. Reference should give name and initials of author, volume, page, month and year of publication in the case of periodicals, and publisher and place and year of publication in the case of books. Illustrations must be clear photographs. Glossy prints are preferred. Drawings must be made in black ink on heavy paper or cardboard. Any illustrations should bear the author's name and be numbered in the order in which they are referred to in the text. Illustrations must not be pasted on the manuscript. Legends should be placed on a separate sheet. Tables are not illustrations and should be numbered separately.

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PUBLIC HEALTH PROGRAMS

I SUGGEST that to a very marked extent public health work is being reoriented by forces quite outside itself; that society is exerting ever-increasing pressure for new and expanding activities that relate to the public health: pressures for expansion and formalizations in mental hygiene, hospitalization, medical care, the hygiene of housing, research. Some of these undertakings require sound organization, wise administration, and proper coordination with already existing health work and with each other. In all of them it is imperative that those who participate possess high professional qualifications. The demand that these things be incorporated in public health programs is very strong, and if the public health agencies are unwilling to accept their proper share of responsibilities in these areas, then other agencies, possibly ill-suited, will attempt to meet the need. I suggest that neither a nostalgia for the simpler days of public health work nor a disapproval of some of the implications in a changing social order is sufficient ground for refusing to meet this responsibility. In the public interest, a decision as to what part we play should be based upon reason and a sense of reality rather than upon an emotional reaction.

Am. J. Pub. Health, December 1947.

THE GIFT OF TONGUES

THE Roman grammarian, Varro, pointed out in a learned treatise that he had discovered 228 distinct meanings for the word "good." His basic point was the same as Aldous Huxley's: "There ought to be some way of dry-cleaning and disinfecting words. Love, purity, goodness, spirit—a pile of dirty linen waiting for the laundress." We are always bringing together by words things that are different, and separating verbally things that are, in fact, the same. A Christian Scientist refused to take vitamin tablets on the ground that they were "medicine"; he willingly accepted them when it was explained that they were "food." An insurance company discovered that behavior toward "gasoline drums" was ordinarily circumspect, that drums are the more dangerous because they contain explosive vapor. The semantic problem is almost insoluble because, as John Locke said, "So difficult is it to show the various meanings and imperfections of words when we have nothing else but words to do it by." This is one of the reasons that a cross-cultural approach is imperative. Anyone who has struggled with translation is made to realize that there is more to a language than its dictionary. The Italian proverb, "traduttore, traditore" (the translator is a betrayer) is all too correct. I asked a Japanese with a fair knowledge of English to translate back from the Japanese that phrase in the new Japanese constitution that represents our "life, liberty, and the pursuit of happiness." He rendered, "license to commit lustful pleasure." English to Russian and Russian back to English transmuted a cablegram "Genevieve suspended for prank" into "Genevieve hanged for juvenile delinquency."

From "Mirror for Man," by Clyde Kluckhohn, Whittlesey House, New York, 1949.

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WHAT IS PREVENTION?

PREVENTION includes measures which avert the *occurrence* of disease and those which halt or retard the *progression* of disease into disability or death. These two major goals of prevention are classed as primary and secondary prevention. *Primary Prevention* means keeping a disease from occurring. Many more chronic diseases and impairments are amenable to primary prevention than one might suppose. For example, use of penicillin in the treatment of expectant mothers who have syphilis results in *primary prevention* of congenital syphilis. The disease does not occur in the infants whose mothers receive adequate treatment during pregnancy. Similarly, the wearing of protective goggles in certain jobs is a method of *primary prevention* of blindness that may result from industrial injury. Proper diet can prevent the occurrence of pellagra, a chronic nutritional deficiency. *Secondary Prevention* means halting the progression of a disease from its early, unrecognized stage to a more severe one. Many encouraging examples of secondary prevention illustrate advances in medical science. One instance cited was Alfreda T., a patient who came to a clinic early in 1922 with diabetes mellitus of three years' duration. Within two days, despite all medical efforts, she developed progressively severe diabetic coma and died. Before the year (1922) was over, the discovery of insulin as a means of controlling diabetes was announced. Since that dramatic discovery, "countless Alfreda T.'s have been spared by diligent case finding and conscientious care."

From "Prevention of Chronic Disease," Summary of 1951 Conference on Chronic Diseases.

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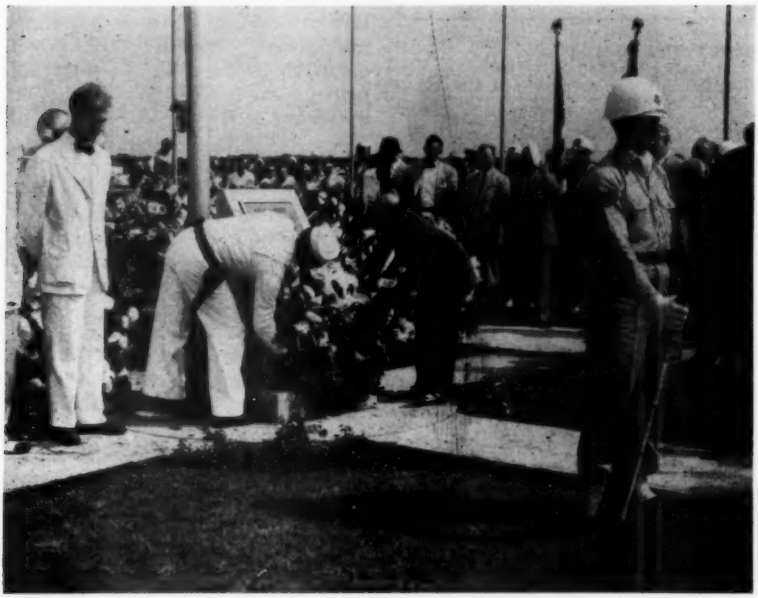

DR. P. W. PATTERSON, representing the National Association of Chiropodists, laying a wreath at the base of the Monument and Dedication Plaque at ceremony on July 5, 1953, dedicating the Coles County, Illinois Memorial Airport, to all men and women of the United States Armed Forces who served in the Armed Forces, during the Korean conflict. Thirty International and National organizations honored these men and women by laying wreaths at the base of the monument in one of the most outstanding ceremonies of Dedication to service men ever held in the United States.

Among other organizations participating in the Dedication were the American Medical Association, American Dental Association and American Red Cross.

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ORGANIZATION NEWS

WEST VIRGINIA

At the annual meeting of the Chiropody Society of West Virginia held in Parkersburg, June 20-21, 1953, the following officers were elected:

President, Dr. Mary E. Lunter
Vice President, Dr. James T. Smith
Secretary-Treasurer, Dr. Malcolm P. Iams
Board of Governors (5 year term), Dr. R. H. Desch
Board of Governors, Region Eight, Dr. E. R. Johnson

Plans for the Region Eight convention, which will be held in Charleston, W. Va., in October, 1953, were discussed. The next annual meeting of the Society will be held in Wheeling. Dr. R. N. Maury has been appointed program chairman.

A Women's Auxiliary of the Society was organized on June 21, 1953, during the annual meeting of the Society. Application for affiliation with the N.A.C. Women's Auxiliary has been made. The following officers were elected: President, Mrs. Ellsworth Johnson; Vice President, Mrs. John Bates; Secretary, Mrs. J. A. Grigg, Jr.; Treasurer, Mrs. Arthur VanCamp.

OFFICERS NEW MEXICO EXAMINING BOARD

The New Mexico State Board of Chiropody Examiners comprises the following members: Dr. E. Lenore Morris, President; Dr. M. L. Clodfelter, Vice President; Dr. Morris Haas, Secretary-Treas.

ILLINOIS

At a meeting of the Mid-State Division of the Illinois Association of Chiropodists held June 21, 1953, in Peoria, Dr. Hugh Macdonald, dermatologist, gave an illustrated lecture on "Skin Diseases Affecting the Lower Extremities." Dr. Geo. Guenzler lectured on "Foot Orthopedics and Flexible Appliance Therapy."

NORTH CAROLINA

The 35th annual meeting of the North Carolina Chiropodists Association was held June 29-30, 1953, at Winston-Salem. The following officers were elected:

President, Dr. W. L. Mauney
Vice President, Dr. Robert Getchell
Secretary-Treasurer, Dr. Morton Gaines

Dr. Charles Darby was elected to the State Board of Chiropody Examiners for a three-year term.

Correction

Due to a typographical error which appeared on page 41 of the June 1953 issue of the Journal, we wish to publish correct figures for (ratio of practitioners to population) for Oklahoma. The total population – 1950 census should have been 2,233,351 and the ratio of practitioners should have been 46,528.

RESERVE OFFICERS FAVOR CHIROPODISTS COMMISSIONS

The Reserve Officers Association of the United States at its 27th Annual Convention held in Philadelphia recently, adopted a resolution favoring the establishment of a chiropody section in the Medical Service Corps of the Armed Forces. Dr. Charles R. Brantingham of Long Beach, Calif., a member of R.O.A., was a delegate to the convention and he worked diligently to have the resolution approved.

The support of R.O.A. should be of great value to the profession in its efforts to obtain professional recognition in the Armed Services.

The text of the resolution follows:

Whereas, The Reserve Officers Association has supported a resolution re: these officers at the 25th and 26th Annual Conventions.

Whereas, the Defense Department Medical Policy Council now reconstituted as the Medical Advisory Council recently determined that chiropodists may be commissioned in the Medical Service Corps, and that Navy Line Officers (podiatrists) may be transferred to the Medical Service Corps; therefore be it

Resolved that R.O.A. in 27th Annual Convention assembled supports the establishment of a chiropody section in the Medical Service Corps in the several services of the Armed Forces.

KANSAS CITY ORGANIZES HOSPITAL CLINIC ASSOCIATION

THE Kansas City Association of Chiropodists has established a Chiropody Clinic at General Hospital No. 1. The clinic started operation on May 12, 1953, with Dr. Cox in charge for that day. Co-operation from the Orthopedic Department was excellent. The Clinic operates one day weekly.

A Kansas City Chiropody Hospital Clinic Association was formed and the following officers were elected:

Chairman, Sam Smith, D.S.C.; Secretary, C. B. Footlick, D.S.C.; Members, Reid Cox, D.S.C.; L. A. Hansen, D.S.C.

N.A.C. DUES ARE PAYABLE NOW

ABSTRACTS AND HEALTH NEWS

DR. CASBERG NAMED ASSISTANT SECRETARY OF DEFENSE

DR. MELVIN A. CASBERG, now Assistant in charge of Medical Affairs to Secretary of Defense Charles E. Wilson, has been named Assistant Secretary for Health and Medical Affairs by President Eisenhower. Dr. Casberg has also become a new member of the National Red Cross board of governors, replacing the Surgeons General of both Army and Navy.

THE NATION'S HEALTH

THE health of the American people operated at peak load in 1952, according to Dr. Louis I. Dublin, second vice president and statistician of the Metropolitan Insurance Company, with continuing good prospects for 1953.

For the fifth year in succession the death rate, which was 9.6 per 1,000 population in 1952, has been below 10; the 1952 rate, indeed, considering the number of older persons in the population, is probably the lowest in history.

"Death Takes a Half Holiday," The New England Journal of Medicine 248:209 January 29, 1953.

SHOE-FITTING FLUOROSCOPES

ARE shoe-fitting fluoroscopes a health hazard? The May 1953 issue of *Occupational Health* quotes excerpts from a report on radiation exposure in New York State shoe stores. Sample findings and conclusions are: Shoe-fitting fluoro-

scopes were used only in stores selling children's shoes. . . The growing child is known to be unusually susceptible to radiation effects. . . . Technical evaluation of the design, maintenance, shielding, and operation of the equipment revealed wide variations in exposure to radiation from different machines—even in machines made by a single manufacturer. . . . Education of the parent and the shoe clerk is essential. . . . The major hurdle is to keep shoe stores under proper surveillance so as to provide adequate protection for the shoe clerks and customers.

The industrial use of X-ray, fluoroscopy, and radioactive isotopes is no longer uncommon. Dr. Mitchell R. Zavon, in listing current industrial uses of radiation, suggests that the industrial physician consider the sources of hazard to which the worker may be exposed, one of which, ionizing radiation, "has become an increasing hazard not because of decreased regard for the possible danger involved but rather because of the increase in potential exposure."

INFERIORITY-ITIS

It has been my feeling that the greatest obstacle to the solution of many of our problems is at the level of the individual pharmacist. The success of any movement rests upon individuals proud of their profession and active as ambassadors of good will for pharmacy.

The occupational disease afflicting pharmacists is a highly developed case of "inferiority-itis." The cure rests in their own hands. When practicing the art and science of compounding, as well as acting as adviser to the allied health professions, the modern pharmacist needs make no apology for his abilities. If he has kept abreast of modern medicine through reading, has attended refresher courses and participated in pharmacy clinics, no whispering apology for pharmacy is necessary. If he dresses like, conducts himself as and practices as a professional man, the confidence gained is the sure cure for this professional disease. If we are not convinced ourselves of the dignity and virtue of our calling it is hard to impress others with these qualities. In general show me a pharmaceutical discontent and I can show you a pharmacist who is dead professionally.

All too often our dirty linens have been washed in public. The misdeeds of a few given publicity in magazines or newspapers bring discredit upon the many honest, ethical professional pharmacists. It is high time that at a county or state level, we organize grievance committees to work out our difficulties. Let us argue constructively among ourselves but present a unified front when the integrity of our profession is attacked.

Official Program, First Annual Rutgers Pharmaceutical Conference, May 14, 1952, New Brunswick, N. J.

DR. RUSSELL M. WILDER RETIRES FROM U. S. PUBLIC HEALTH SERVICE

Dr. Russell M. Wilder, first director of the National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Public Health Service, retired July 1, 1953. Dr. Wilder, internationally known for his work in metabolic diseases and nutrition, came to the Public Health Service in January, 1951, shortly after his retirement from the Mayo Foundation where he was professor of medicine and

chief of the department of medicine. He will continue as a member of the Board of Editors of Public Health Reports. Dr. Wilder will make his home at Rochester, Minn.

INDUSTRIAL DENTAL PROGRAMS

BECAUSE of the growing interest in dental programs for various groups of persons in the United States, the Council on Dental Health has made an effort to determine the extent and type of these programs in industry. A survey of existing industrial dental programs was reported to the Council when it held its second meeting of the year April 27 to 29 in the Central Office.

A list of known programs was compiled by the Council through contact with state dental directors, certain industries and unions, the American Association of Industrial Dentists and the U. S. Public Health Service.

A total of 162 questionnaires was sent to individuals and organizations. By March 22 of this year, 52 replies had been received, seven reporting no programs or their discontinuance. The answers evidenced a lack of uniformity of pattern for dental services. Several programs render complete dental care on a reduced fee basis at the expense of the employee; a few provide services paid for by the companies involved; insurance takes care of a few more, and a mixture of these plans comprises the balance. Some programs emphasize repair and replacement; others, emergency service only, while a significant proportion use dental health education and referral methods. No mention was made of industrial hazards, but it is believed that the questionnaire was probably responsible for this lack of information.

The following data, compiled from the 52 returned questionnaires, show the lack of uniformity of pattern:

Organizational factors

Number having chief of dental staff	36
Total number of dentists on staffs	91
Total number of dental hygienists	35
Number with dental service under medical department	23
Number with dental department independent of medical department	15
Number reporting that dental and medical departments cooperate	30
Approximate total number of employees	78,206
Total number receiving dental care per year	60,652

Method of payment for dental services	Number of programs
Employee pays entire fee	10
Employee pays part fee	6
Employee pays no fee	19
Fees paid through insurance	5

Dental services provided	Number of programs
Pre-employment examinations	26
Periodic examinations	34
Roentgenograms—full mouth	35
Roentgenograms—bitewing	30
Emergency only	12
Referral	26
Dental prophylaxis	27
Extractions	30
Treatments	37
Fillings	21
Root canal	7
Inlay—bridge and crown	11
Dentures—partial	12
Dentures—full	13
Others	7
Educational programs	29

Thus far, only four programs have been found to conform fully with the standards recommended by the Council on Dental Health. The standards are based on the following services: pre-employment and periodic examinations including roentgenograms, emergency care for the relief of pain (to keep workers on the job), consultations, prophylaxis, referral to private practitioners for needed dental treatment, observation and elimination of industrial hazards, keeping of adequate records and dental health education.

Although much has been written on the subject since 1929, the Council concluded that its survey indicates there is no general understanding as to the value and scope of dental programs in industry.

J.A.D.A. July, 1952

DEVIATIONS FROM NORMAL

In promoting industrial health we cannot afford to become nearly as interested in actually putting our diagnostic finger on the obvious, full-blown occupational disease as we are in the detection of early signs and symptoms, both objective and subjective, which may mean possible early deviations from normal. It has always seemed to me more logical to use early signs and symptoms as potential danger signals and to make this the basis for direct action by the engineer, or the chemist, or the hygienist. It is just more of the old business of locking the door before the horse is stolen. I am not one to wait until we have diagnosed and published an impressive series of cases before we take action. The industrial physician must, in the course of periodic health examinations, make certain that deviations from normal are not of occupational origin before he assumes the condition to be insidious or idiopathic. He must be alert to the possibilities, rather than arbitrarily assume that the working environment is faultless unless legally proved to be otherwise.

—From an Address by H. W. Lawrence, M.D., Medical Director, Procter & Gamble, at the Seventeenth Annual Meeting, Industrial Hygiene Foundation, Pittsburgh, Nov. 20, 1952.

DRUGS AFFECTING SKELETAL MUSCLE

Acetylcholine has been recognized as the chemical transmitter at the neuromuscular junction and at ganglia in the sympathetic nervous system, and it probably has the same function as the transmitter in the central nervous system. It is the consensus that neostigmine acts as an anticholinesterase agent to prolong the action of acetylcholine at the neuromuscular junction and at synapses. Like most quaternary salts, it cannot penetrate the central nervous system. Neostigmine acts as an anticurare agent by building up the concentration of

Doctor — Are You Educating Your Patients?

Regular foot examinations are important to health. Suggest them during office visits. You can make a real contribution to our public education program by cooperating in this manner.

acetylcholine until the threshold for stimulation is reached. Tensilon, a simple analog of neostigmine, is more specific as an anticurare agent than neostigmine and is believed to act like acetylcholine itself in displacing curare from the site of action and stimulating the muscle directly, but considerable evidence is accumulating that it may act partially as an anticholinesterase agent.

Numerous synthetic curarimimetic agents are now known, and some have found clinical usefulness. These synthetics have been classified into two divisions, the tubocurarine-like compounds and the decamethonium-like compounds. The tubocurarine class acts by competing with acetylcholine for receptors at the neuromuscular junction and the action is antagonized by neostigmine or Tensilon. The decamethonium class acts by depolarizing the muscle membrane just as acetylcholine itself does and, consequently, the action is not antagonized by neostigmine or Tensilon. Intermediate classes having some of the properties of both of the above classes are becoming available and even decamethonium itself may have a complex mode of action instead of being purely depolarizing.

L. O. Randall, Ph.D., and L. M. Jampolsky, Ph.D., Special Review, Pharmacology of Drugs Affecting Skeletal Muscle, American Journal of Physical Medicine, April, 1953.

PATRONIZE JOURNAL ADVERTISERS

SHORTCOMINGS OF SPECIALIZATION

THOSE engaged in arts and science, most Gracious Emperor Charles, find many obstacles to the exact study and successful application of them. In the first place, no slight inconvenience from too great separation between branches of study which serves for the perfection of one Art. But much worse is the mischievous distribution among different practitioners of the practical application of the art. This has been carried so far that those who have set before themselves the attainment of an art embrace one part of it to the neglect of the rest, although they are intimately bound up with it and can by no means be separated from it.

Vesalius (1542)

DRUG ERUPTIONS

EVERY physician who prescribes drugs or who treats persons who have taken drugs is repeatedly and inevitably confronted with the problem of recognizing and managing their side-effects, and particu-

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larly the eruptions they may produce. These eruptions are not only exceedingly common but are also of almost limitless variety. Clinicians formerly described syphilis and sometimes tuberculosis as the "great imitators." Today this statement can be applied with even greater emphasis to eruptions due to ingested, inhaled or injected medicaments or those absorbed by other routes. . . . The eruptions in which medicaments play a casual or contributory role can take on the appearance typical of almost any dermatologic entity and can, furthermore, produce their own peculiarly characteristic forms as well as the most atypical and puzzling pictures. For this reason the physician who wishes to avoid serious diagnostic errors and their consequences must be on the alert for the possibility of drug causation in almost every case of cutaneous disease.

W. B. Sulzberger, M.D., and J. Wolf, M.D., Dermatology, Essentials of Diagnosis and Treatment, Chicago, The Year Book Publishers, 1952

DANCING FEET

It is becoming a maxim that "Occupational Diseases are where you find them." Therefore, it is not remarkable that the appraising medical eye be directed to the feet of those who dance as a professional activity. Rutt (Zeitschrift fur Orthopedie, 82:370, 1952) made clinical and roentgenologic examinations of the feet of 35 male and female dancers. Observations were made on this group at the practice studios. Somewhat unexpectedly it was noted that the classic dancers—toe dancers – presented feet far more nearly normal as to anatomical state than those devoted to modern dances. This difference was attributed to the sturdy built-up shoes of toe dancers who thereby were well protected and especially supported in the anterior portions of the feet. In contrast, modern dancers dance barefoot or wear flimsy, little protective shoes. Unlike the shapely feet of the toe dancers, those of modern dancers reveal all manner of distortion—splayed or flat feet, bunions and hallux valgus. The difference? Foot apparel.

Ind. Med. Surg. Vol. 22, No. 3.

NEW WET DRESSING THERAPY

Wet dressings made from a sodium propionate-chlorophyll powder,

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The N.A.C. fiscal year ended on May 31, 1952. Dues for 1952-53 were due June first. Members are requested to send their checks to their respective state society secretaries or treasurers immediately.

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The wet dressings were easy to prepare, non-staining and pleasant to use. Individual packets of 2.3 gm. powder make a 1 per cent sodium propionate solution in eight ounces of water, although in acutely inflammed conditions a dilution of one packet to a pint (16 oz.) of warm water was preferred. Patients used the soak fifteen to twenty minutes three or four times daily.

A sodium propionate – chlorophyll ointment was employed in certain cases for night-time use or when it was deemed timely to discontinue use of the aqueous preparation.

J. New Jersey Chirop. Soc. p. 4; Vol. 2; No. 3; April, 1953

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You are really a marvelous creature. From the top of your head to the soles of your feet, you have been fearfully and wonderfully wrought.

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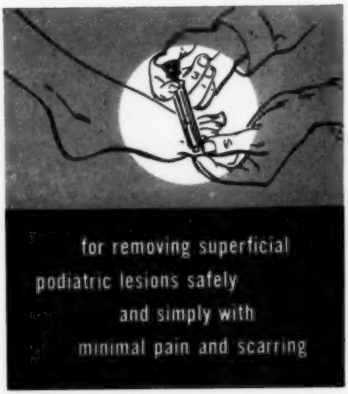

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***IGNATOFF, W. B.: J. NAT'L. ASSN. CHIROP. 42:46 (SEPT.) 1952.**

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Professional Supply Co., Topeka, Kansas
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Fort Steuben Dental Co., Steubenville, O.

could suggest some obvious improvements? Very well. I shall try to prove my point. It does not make much difference whether we start with the hair of your head or that bag of bones that you call your foot. Both are wonderful creations.

Let's try a foot. Rather unromantic, isn't it? Faithful and useful to be sure, but hardly a thing to inspire rapture. But wait. Into a small space a variety of minute bones are fitted together so skillfully that they can stand a terrific pounding day in and day out and still keep the spring of a well-designed arch.

If you weigh a moderate 130 pounds, your feet may be pounded by 1,500 tons in an average day. If you live to be 70, you may expect this little bundle of bones to run, walk, or stand under a total of something like 40,000,000 tons of weight. If you pounded your foot once a minute with a 16-pound sledge hammer, it would take 10,000 years to equal it. Where could you find anything made of steel or wood that could respond to so many purposes and endure so faithfully? Tonight, when you take your shoes off, take a good look at your feet and thank God that you are so marvelously made.

E. N. Jackson, Christian Advocate, May 28, 1953

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Chicago, Ill., August 12-17, 1954
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DEATHS REPORTED

Dr. Henry Pontone
Jersey City, N. J.

It is with great sorrow that we report the death of our colleague, Dr. Henry Pontone. Dr. Pontone died, May 30, 1953, after an illness of over a year at the age of 76.

Dr. Pontone practiced for over 50 years. He was active in the forming of the New Jersey Chiropodists Society and in the enactment of the first chiropody law in New Jersey. He was a past Vice President of the State Society and a Life Member.

Dr. M. D. Pollock
Little Rock, Ark.

Dr. John Dyer
Johnstown, Pa.

Mrs. Martin L. Finkelstein
Syracuse, N. Y.

Mrs. Gertrude Finkelstein, wife of Dr. Martin Finkelstein of Oneida, N. Y., passed away on July 8, 1953. Mrs. Finkelstein is survived by her husband, Martin, and two daughters.

Dr. A. J. Thorman
Cincinnati, Ohio

Dr. A. J. Thorman of Cincinnati, Ohio, and Fort Thomas, Ky., passed away July 10, 1953. He was a charter member of the Ohio Chiropodists Association, having served as president of that organization. Dr. Thorman was a life member of both the Ohio and National associations. He retired from practice several years ago and was succeeded by his son-in-law, Dr. Harry Meyer, and two grandsons, Dr. Harry Meyer, Jr., and Dr. Thomas Meyer. Two daughters and several grandsons survive him. He will be greatly missed by his friends in the profession.

Dr. C. P. Beach

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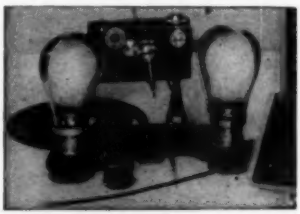

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FRIDAY	Angle Radiography
9:00 a.m.-10:30 a.m.	Dr. Helen Havey, Chicago, Ill.
10:00 a.m.- 5:00 p.m.	Roentgenological Interpretation Dr. Irving Yale, Ansonia, Conn.
SATURDAY	Practical Chiropody, Paddings,
9:00 a.m.- 5:00 p.m.	Corrections, Office Procedures Dr. M. Polokoff, Paterson, N. J.
7:30 p.m.	BANQUET and Annual Meeting, Morrison Hotel
SUNDAY	Case Histories, Patient Follow-up,
9:00 a.m.- 5:00 p.m.	Diagnosis, Treatment, Surgical Considerations Dr. N. J. Pickett, Norfolk, Nebr.
MONDAY	FOOT SURGERY, Hospital Pro-
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